



NEW ZEALAND

EDICT OF GOVERNMENT

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AS-NZS 8124-1 (2002) (English): Safety of toys -
Part 1: Safety aspects related to mechanical and
physical properties [By Authority of New Zealand
Product Safety Standards (Children's Toys)
Regulations 2005 (SR 2005/236)]

ISO INSIDE

*We will sell to no man,
we will not deny or defer to any man either justice or right.*

Magna Carta—Tūtohunga Nui

*Kore rawa e hoko ki te tangata, e kore e whakakāhoretia,
e tautuku rānei te tangata ki te ture, tika ranei.*



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Australian/New Zealand Standard™

Safety of toys

Part 1: Safety aspects related to mechanical and physical properties (ISO 8124-1:2000, MOD)

AS/NZS ISO 8124.1:2002

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee CS-018, Safety of Childrens Toys. It was approved on behalf of the Council of Standards Australia on 30 April 2002 and on behalf of the Council of Standards New Zealand on 18 April 2002.

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The following are represented on Committee CS-018:

Australian Chamber of Commerce and Industry
Australian Competition and Consumer Commission
Australian Consumers Association
Australian Hearing
Australian Retailers Association
Commerce Commission New Zealand
Department of Fair Trading NSW Consumer
Kidsafe
Ministry of Health, New Zealand
New Children's Hospital, Westmead
New Zealand Toy Distributors Association
Office of Consumer and Business Affairs South Australia
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We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR 01339.

Australian/New Zealand Standard™

Safety of toys

Part 1: Safety aspects related to mechanical and physical properties (ISO 8124-1:2000, MOD)

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CS-018, Safety of Childrens Toys. It is an adoption with national modifications and has been reproduced from ISO 8124-1:2000, *Safety of toys, Part 1: Safety aspects related to mechanical and physical properties*.

This Standard incorporates Amendment No. 1 (May 2007), No. 2 (February 2009) and Amendment No. 3 (August 2009). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The objective of this Standard is to provide a specification for general safety, construction and labelling requirements for toys complying with the proposed AS/NZS ISO 8124.1.

For the purpose of this Standard, the ISO text is modified as set out in Appendix ZZ. These changes are indicated by a marginal bar against the relevant clause or part thereof affected.

The changes were made to ISO 8124-1 for the following reasons:

- (a) To retain the previously used warnings on packaging which are uniformly applied to packaging of many different types of products, not just toys, in Australia and New Zealand.
- (b) To use terms more commonly in use in Australia and New Zealand.
- (c) To include additional advice.

As this Standard is reproduced from an international publication, the following applies.

- (i) Its number appears on the cover and title page while the International Standard number appears only on the cover.
- (ii) In the source text, 'this part of ISO 8124' should read 'this Australian/New Zealand Standard'.
- (iii) A full point substitutes for a comma when referring to a decimal marker.

References to international Standards should be replaced by equivalent Australian, New Zealand or Australian/New Zealand Standards, as follows:

<i>Reference to International Standard or other publication</i>		<i>Australian/New Zealand Standard</i>	
ISO		AS	
868	Plastics and ebonite—Determination of indentation hardness by means of a durometer (Shore hardness)	1683 1683.15.1	Methods of test for elastomers Part 15.1: International rubber hardness
4287	Surface roughness—Terminology		
4287-2	Part 2: Measurement of surface roughness parameters	1683.15.2	Part 15.2: Durometer hardness
4593	Plastics—Film and sheeting—Determination of thickness by mechanical scanning	2382	Surface roughness comparison specimens
6508	Metallic materials—Rockwell hardness test	1815	Metallic materials—Rockwell hardness test
6508-1	Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)		

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex or appendix to which they apply. A 'normative' annex or appendix is an integral part of a Standard, whereas an 'informative' annex or appendix is only for information and guidance.

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NOTES

AUSTRALIAN/NEW ZEALAND STANDARD

Safety of toys

Part 1:

Safety aspects related to mechanical and physical properties (ISO 8124-1:2000, MOD)

1 Scope

The requirements in this part of ISO 8124 apply to all toys, i.e. any product or material designed or clearly intended for use in play by children under 14 years of age. They are applicable to a toy as it is initially received by the consumer and, in addition, they apply after a toy is subjected to reasonably foreseeable conditions of normal use and abuse unless specifically noted otherwise.

The requirements of this part of ISO 8124 specify acceptable criteria for structural characteristics of toys, such as shape, size, contour, spacing (e.g. rattles, small parts, sharp points and edges, hinge-line clearances) as well as acceptable criteria for properties peculiar to certain categories of toy (e.g. maximum kinetic energy values for non-resilient-tipped projectiles, minimum tip angles for certain ride-on toys).

This part of ISO 8124 specifies requirements and test methods for toys intended for use by children in various age groups from birth to 14 years. The requirements vary according to the age group for which a particular toy is intended. The requirements for a particular age group reflect the nature of the hazards and the expected mental and/or physical abilities of the child to cope with them.

This part of ISO 8124 also requires that appropriate warnings and/or instructions for use be given on certain toys or their packaging. Due to linguistic problems that may occur in different countries, the wording of these warnings and instructions is not specified but given as general information in annex C. It should be noted that different legal requirements exist in many countries with regard to such marking.

This part of ISO 8124 does not purport to cover or include every conceivable potential hazard of a particular toy or toy category. Except for labelling requirements indicating the functional hazards and the age range for which the toy is intended, this part of ISO 8124 has no requirements for those characteristics of toys that represent an inherent and recognized hazard that is integral to the function of the toy.

NOTE An example of such a hazard is the sharp point necessary for the proper function of a needle. The needle is a hazard that is well understood by the purchaser of a toy sewing kit, and the functional sharp point hazard is communicated to the user as part of the normal educational process as well as at the point of purchase by means of cautionary labelling on the product's packaging.

As a further example, a toy scooter has inherent and recognized hazards associated with its use (e.g. instability during use, especially whilst learning). The potential hazards associated with its structural characteristics (sharp edges, pinch hazards, etc.) will be minimized by compliance with the requirements of this part of ISO 8124.

Products not included within the scope of this part of ISO 8124 are

- a) bicycles, except for those considered to be toys, i.e. those having a maximum saddle height of 435 mm (see E.1);
- b) slingshots;

NOTE "Slingshots" are also known as "catapults"

- c) darts with metal points;
- d) home and public playground equipment;
- e) compressed air and gas operated guns and pistols (see E.1);
- f) kites (except for the electric resistance of their strings, which is included);
- g) model kits, hobby and craft items in which the finished item is not primarily of play value;
- h) sporting goods and equipment, camping goods, athletic equipment, musical instruments and furniture; however, toys that are their counterparts are included.

It is recognized that there is often a fine distinction between, for example, a musical instrument or a sporting item and its toy counterpart. The intention of the manufacturer or distributor, as well as normal use and reasonably foreseeable abuse, determines whether the item is a toy counterpart or not;

- i) models of aircraft, rockets, boats and land vehicles powered by combustion engines; however, toys that are their counterparts are included (see E.1);
- j) collectible products not intended for children under 14 years of age;
- k) holiday decorations that are primarily intended for ornamental purposes;
- l) aquatic equipment intended to be used in deep water;
- m) toys installed in public places (e.g. arcades and shopping centres);
- n) puzzles having more than 500 pieces or without a picture, for specialists;
- o) fireworks including percussion caps, except percussion caps specifically designed for toys;
- p) products containing heating elements intended for use under the supervision of an adult in a teaching context;
- q) steam engines;
- r) video toys that can be connected to a video screen and operated at a nominal voltage greater than 24 V;
- s) babies' pacifiers (dummies);
- t) faithful reproduction of firearms;
- u) electric ovens, irons or other functional products operated at a nominal voltage greater than 24 V;
- v) bows for archery with an overall relaxed length exceeding 120 cm;
- w) fashion jewellery for children (see E.1).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 8124. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 8124 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 868:1985, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)*.

ISO 4287-2:1997, *Surface roughness — Terminology — Part 2: Measurement of surface roughness parameters*.

ISO 4593:1993, *Plastics — Film and sheeting — Determination of thickness by mechanical scanning*.

ISO 6508-1:1999, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*.

3 Terms and definitions

NOTE Whenever the term “months” is used in this part of ISO 8124, it denotes that the designated number of months is completed (i.e. 18 months means up to and including 18 full months of age).

For the purposes of this part of ISO 8124, the following terms and definitions apply.

3.1

accessible

⟨part or component⟩ describing any area of the toy that can be contacted by any portion forward of the collar of the accessibility probe as described in 5.7

3.2

aquatic toy

article, whether inflatable or not, intended to bear the mass of a child and used as an instrument of play in shallow water

NOTE Bathroom toys and beach balls are not considered aquatic toys.

3.3

ball

spherical, ovoid, or ellipsoidal object designed or intended to be thrown, hit, kicked, rolled, dropped or bounced

NOTE 1 This definition includes balls attached to a toy or article by a string, elastic cord or similar tether and also any multi-sided object formed by connecting planes into, and any novelty item of, a generally spherical ovoid or ellipsoidal shape designed or intended to be used as a ball.

NOTE 2 This definition does not include dice, or balls permanently enclosed inside pinball machines, mazes, or similar outer containers. A ball is permanently enclosed if, when tested according to 5.24 (reasonably foreseeable abuse), it is not removed from the outer container.

3.4

backing

material adhering to flexible plastic sheeting

3.5

battery-operated toy

toy having at least one function dependent on electricity and powered by batteries

3.6

burr

roughness caused by not cleanly severing or finishing the material

3.7

collapse

sudden or unexpected folding of a structure

3.8**cord**

length of slender, flexible material

EXAMPLES Monofilaments, woven and twisted cord, rope, plastic textile tapes, ribbon and those fibrous materials known as string.

3.9**crushing**

injury to part of the body resulting from compression between two rigid surfaces

3.10**discharge mechanism**

inanimate system for releasing and propelling a projectile

3.11**driving mechanism**

assembly of linked parts or components (e.g. gears, belts, winding mechanisms), at least one of which moves, powered by a source (e.g. electrical or mechanical means) independent of the child

3.12**edge**

line, formed at the junction of two surfaces, whose length exceeds 2,0 mm

3.12.1**curled edge**

edge in which the portion of the sheet adjacent to the edge is bent into an arc and forms an angle of less than 90° with the base sheet

See Figure 1.

3.12.2**hemmed edge**

edge in which the portion of the sheet adjacent to the edge is folded back on the sheet itself through an angle of approximately 180°, so that the portion of the sheet adjacent to the edge is approximately parallel to the main sheet

See Figure 1.

3.12.3**rolled edge**

edge in which the portion of the sheet adjacent to the edge is bent into an arc and forms an angle between 90° and 120° with the main sheet

See Figure 1.

3.13**expanding material**

material whose volume expands when exposed to water

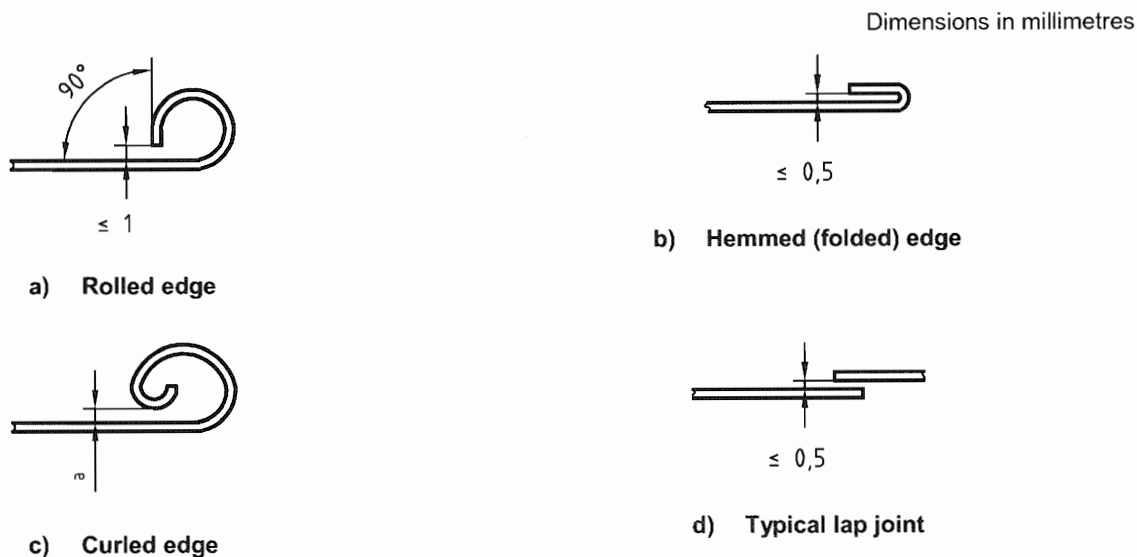
3.14**fastener**

mechanical device which attaches two or more elements together

EXAMPLE Screws, rivets, staples.

3.15**feathering**

beveling of an edge (or decrease in thickness moving toward the edge) caused during shearing or cutting of material



a No limit.

Figure 1 — Edges

3.16

flash

excess material that escapes between the mating parts of a mould assembly

3.17

folding mechanism

hinged, pivoted, folding or sliding assembly that could crush, scissor, pinch or shear during operation

EXAMPLE Toy ironing boards, toy pushchairs.

3.18

functional toy

toy which performs and is used in the same way as, and is often a scale model of, a certain product, appliance or installation intended for adults

EXAMPLE Stove with heating properties.

3.19

fuzz

bits of fibrous-type material that can be readily removed from toys with a pile surface

3.20

glass

hard, brittle, amorphous substance produced by fusion, usually consisting of mutually dissolved silica and silicates that also contain soda and lime

3.21

harm

physical injury or damage to the health of people or damage to property or the environment

3.22

hazard

potential source of harm

NOTE The term hazard can be qualified in order to define its origin or the nature of the expected harm (i.e. electric shock hazard, crushing hazard, cutting hazard, toxic hazard, fire hazard, drowning hazard).

3.23 hazardous projection
projection that, because of its material or configuration or both, may present a puncture hazard should a child step on or fall onto it

NOTE 1 Excluded from this definition are puncture hazards to the eyes and/or mouth, because of the impossibility of eliminating puncture hazards to those areas of the body by product design.

NOTE 2 If the projection is on a small toy which topples over when pressure is applied to the end of the projection, it is unlikely to present a hazard.

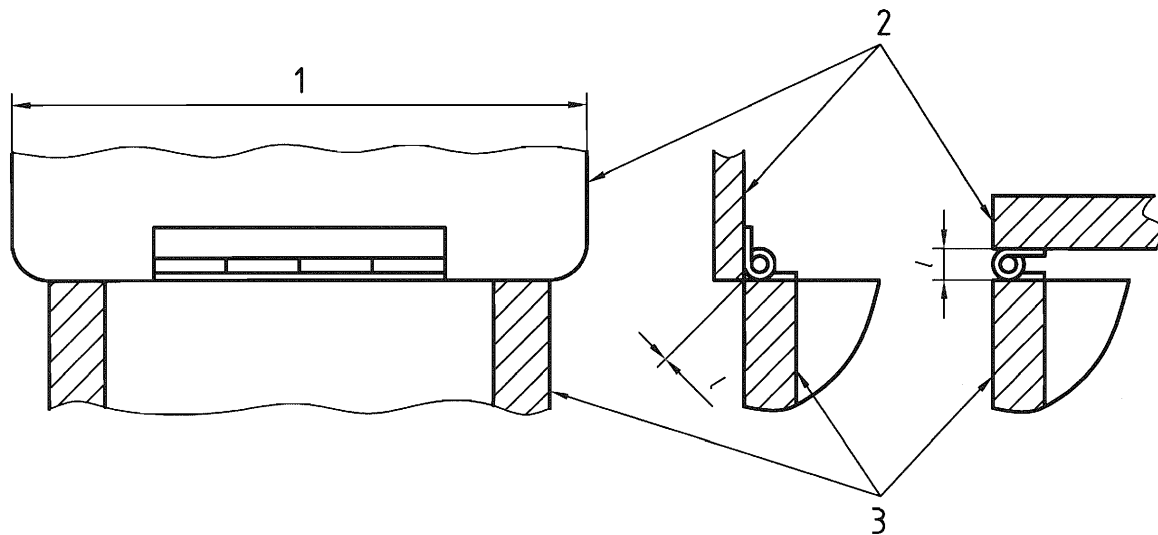
3.24 hazardous sharp edge
accessible edge of a toy that presents an unreasonable risk of injury during normal use and reasonably foreseeable abuse

3.25 hazardous sharp point
accessible point of a toy that presents an unreasonable risk of injury during normal use or reasonably foreseeable abuse

3.26 hinge-line clearance
distance between the stationary portion of a toy and the movable portion along or adjacent to a line projected through the axis of rotation

See Figure 2.

3.27 intended use
use of a product, process or service in accordance with information provided by the supplier



Key

- 1 Hinge line
- 2 Lid
- 3 Box

l = Hinge-line clearance

Figure 2 — Hinge-line clearance

3.28**lap joint**

joint in which an edge overlaps a parallel surface but is not necessarily mechanically attached to it at all points along the length

See Figure 1.

3.29**large and bulky toy**

toy that has a projected base area of more than $0,26 \text{ m}^2$ or a volume of more than $0,08 \text{ m}^3$ calculated without regard to minor appendages

NOTE The base area for toys having permanently attached legs is measured by calculating the area enclosed by straight lines connecting the outermost edge of each leg of the perimeter.

3.30**marble**

sphere made of hard material, such as glass, agate, marble or plastic, that is used in various children's games, generally as a playing piece or marker

3.31**metal**

material comprising elemental metal and/or metal alloys

3.32**normal use**

play modes that conform to the instructions that accompany the toy, that have been established by tradition or custom, or that are evident from an examination of the toy

3.33**packaging**

material accompanying the toy when purchased, but having no intended play function

3.34**paper**

material, marketed as either paper or paperboard, with a maximum areic mass of 400 g/m^2

3.35**play furniture**

furniture intended for use by a child and intended to, or likely to, support the mass of a child

3.36**pompom**

lengths or strands of fibre, yarns or threads clamped or secured and tied in the centre, and brushed up to form a spherical shape

NOTE 1 This definition includes spherical-shaped attachments made of stuffed materials (see Figure 3).

NOTE 2 Tassels with long strands are not considered pompoms (see Figure 4).



Figure 3 — Regular and rounded pompoms



Figure 4 — Tassel with long strands

3.37

projectile

object intended to be launched into free flight, or a trajectory, in the air

3.38

projectile toy with stored energy

toy with a projectile propelled by means of a discharge mechanism capable of storing and releasing energy

3.39

projectile toy without stored energy

projectile discharged by the energy imparted by a child

3.40

protective cap or cover

component that is attached to a potentially hazardous edge or projection to reduce the risk of injury

3.41

pull toy

toy that is intended to be pulled along the floor or ground

NOTE Toys intended for children aged 36 months or more are not regarded as pull toys.

3.42

reasonably foreseeable abuse

use of a toy under conditions or for purposes not intended by the supplier, but which can happen, induced by the toy in combination with, or as a result of, common behaviour in a child

EXAMPLES Deliberate disassembly, dropping or using a toy for a purpose for which it was not intended.

NOTE Tests simulating reasonably foreseeable abuse are given in 5.24.

3.43

removable component

part or component which is intended to be removed from the toy without the use of tools

3.44

rigidity

hardness of material exceeding 70 Shore A scale durometer as measured in accordance with ISO 868

3.45

risk

combination of the probability of occurrence of harm and the severity of that harm

3.46

simulated protective equipment

toys designed to mimic products that infer some sort of physical protection to the wearer

EXAMPLES Protective helmets, visors.

3.47**soft-filled toy
stuffed toy**

toy, clothed or unclothed, with soft body surfaces and filled with soft materials, allowing compression of the torso readily with the hand

3.48**splinter**

sharp pointed fragment

3.49 springs**3.49.1****helical spring**

spring in the form of a coil

See Figure 5.

3.49.1.1**compression spring**

helical spring which essentially returns to its initial state after compression

3.49.1.2**extension spring**

helical spring which essentially returns to its initial state after tension

3.49.2**spiral spring**

clockwork-type spring

See Figure 6.

3.50**teether**

toy designed for oral use and intended primarily for symptomatic relief of teething discomfort

3.51**tool**

screwdriver, coin or other object which may be used to operate a screw, clip or similar fixing device

3.52**toy**

any product or material designed or clearly intended for use in play by children less than 14 years of age

3.53**toy bicycle**

two-wheeled vehicle, with or without stabilizers, with a maximum saddle height of 435 mm and which is propelled solely by the muscular energy of the child on that vehicle, in particular by means of pedals

3.54**toy chest**

container with a hinged lid enclosing a volume greater than 0,03 m³, specifically designed for storing toys

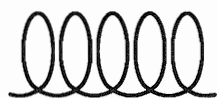


Figure 5 — Helical spring



Figure 6 — Spiral spring

4 Requirements

4.1 Normal use (see E.2)

Toys shall be tested to simulate reasonably foreseeable normal use in order to ensure that hazards are not generated as a result of normal wear and/or deterioration (see E.2 for guidance).

Toys labelled as washable shall be subjected to washing in accordance with 5.23.

After testing, the toy shall continue to conform to the relevant requirements of clause 4.

4.2 Reasonably foreseeable abuse (see E.3)

All toys shall be tested in accordance with the relevant normal use tests in 5.1 to 5.23. After the normal use test, toys intended for children under 96 months, unless otherwise stated, shall be tested in accordance with 5.24 for reasonably foreseeable abuse (see E.3).

After testing, the toy shall continue to conform to the relevant requirements of clause 4.

4.3 Material

4.3.1 Material quality (see E.4)

All materials shall be visually clean and free from infestation. The materials shall be assessed visually by the unaided eye rather than under magnification.

4.3.2 Expanding materials (see E.5)

Toys and components of toys which fit entirely in the small parts cylinder when tested in accordance with 5.2 (small parts test) shall not expand more than 50 % in any dimension when tested in accordance with 5.21 (expanding materials).

This requirement does not apply to seeds in growing kits.

4.4 Small parts (see E.6)

4.4.1 For children up to and including 36 months

Toys intended for children up to and including 36 months, removable components thereof and components liberated during testing in accordance with 5.24 (reasonably foreseeable abuse tests) shall not fit entirely, whatever their orientation, into the small parts cylinder when tested in accordance with 5.2 (small parts test).

The requirement also applies to fragments of toys, including, but not limited to, pieces of flash, slivers of plastics and pieces of foam or shavings.

The following are exempted before and after subjecting the toy to the tests according to clause 5:

- paper books and other articles made of paper and pieces of paper;
- writing materials such as crayons, chalk, pencils and pens;
- modelling clay and similar products;
- fingerpaints, water colours, paint sets and paint brushes;
- fuzz;

- balloons;
- textile fabric;
- yarn;
- elastic and string.

Guidance on categories of toys that can be considered as intended for children up to and including 36 months is given in B.4.2.

4.4.2 For children from 37 months up to and including 72 months

Toys and toys containing removable components, intended for children from 37 months up to and including 72 months, which fit entirely in the small parts cylinder when tested in accordance with 5.2, shall carry a warning (see C.2.3 for guidance).

4.5 Shape, size and strength of certain toys (see E.7)

4.5.1 Squeeze toys, rattles and certain other toys

Except for soft-filled (stuffed) toys or soft-filled parts of toys or parts of fabric, the requirements in a) and b) apply to the following types of toys:

- squeeze toys intended for children under 18 months;
- rattles;
- teethingers and teething toys;
- legs of baby gyms.

and also the following toys with a mass less than 0,5 kg intended for children too young to sit up unaided:

- removable components of toys intended to be strung across a crib, playpen or perambulator;
 - removable components of baby gyms;
- Such toys shall be designed so that no portion shall be capable of entering and penetrating past the full depth of the cavity of the test template A when tested in accordance with 5.3;
 - Such toys with nearly spherical, hemispherical, or circular flared ends shall be designed so that such ends are not capable of entering and penetrating past the full depth of the cavity of the supplemental test template B when tested in accordance with 5.3.

4.5.2 Small balls

A small ball is any ball that passes entirely through the template when tested in accordance with 5.4.

- Toys intended for children up to and including 36 months shall not be small balls or contain removable small balls.
- Toys intended for children from 37 months up to and including 96 months that are small balls or contain removable small balls, or small balls liberated after testing in accordance with 5.24, shall carry a warning [see C.2.5 a) for guidance].

4.5.3 Pompoms (see E.8)

Pompoms intended for children up to and including 36 months that become detached when tested in accordance with 5.24.6.3 (tension test for pompoms) shall not pass entirely through the test template when tested in accordance with 5.5 (test for pompoms). Any components, pieces or individual strands that are detached from the pompom during the torque or tension tests shall not be subjected to the test in 5.5.

4.5.4 Preschool play figures (see E.9)

Except for soft play figures made of textiles, preschool figures intended for children up to and including 36 months having

- a) a round, spherical or hemispherical end with tapered neck attached to a simple cylindrical shape without appendages; and
- b) an overall length not exceeding 64 mm (see Figure 7)

shall be designed so that the rounded end shall not be capable of entering and penetrating past the full depth of the cavity of the test template when tested in accordance with 5.6 (test for preschool play figures). The requirement applies to figures with added or moulded features such as hats or hair, which retain the rounded shape of the end.

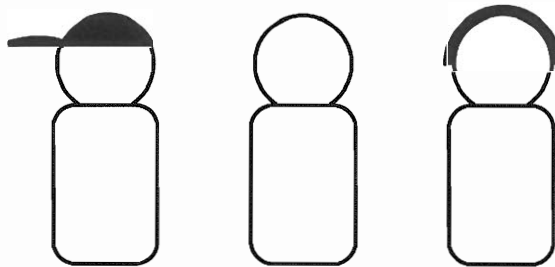


Figure 7 — Examples of play figures

4.5.5 Toy pacifiers

Toy pacifiers attached to or sold with toys intended for children up to and including 36 months shall have a nipple length no longer than 16 mm. This dimension shall be measured from the nipple side of the shield to the end of the nipple.

NOTE Real pacifiers attached to or sold with toys shall comply with national regulations for real pacifiers.

4.5.6 Balloons [see also 4.10, 4.25 d) and E.10]

Balloons made of rubber latex shall carry a warning (see C.2.4 for guidance).

4.5.7 Marbles

The packaging of marbles and toys containing removable marbles or marbles liberated after testing according to 5.24 (reasonably foreseeable abuse tests) shall carry a warning [see C.2.5 b) for guidance].

4.6 Edges (see E.11)

4.6.1 Accessible sharp edges of glass or metal

- a) Accessible edges on toys intended for children under 96 months shall not be hazardous sharp edges of glass or metal when tested in accordance with 5.8 (sharp edge test).

If an accessible edge fails the sharp edge test as given in 5.8 (sharp edge test), the edge shall be assessed to determine whether it presents an unreasonable risk of injury, taking into account the foreseeable use and intended age grade of the toy.

- b) Potentially sharp glass or metal edges shall be considered non-accessible if they lie adjacent to a surface of the test sample, and any gap between the edge and the adjacent surface does not exceed 0,5 mm (e.g. in lap joints and hemmed edges, see Figure 1).
- c) Edges of pieces intended to serve as electrical conductors and microscope slides and cover slips are considered as functional edges and do not require a warning.

4.6.2 Functional sharp edges

- a) Toys intended for children up to and including 36 months shall not have accessible hazardous functional sharp edges.
- b) Toys intended for children from 37 months up to and including 96 months that by reason of their function (e.g. functional toy scissors and functional toy tool kits) necessarily include a sharp edge and that do not include any non-functional sharp edges are exempt from 4.6 provided that the packaging carries a warning (see C.2.12 for guidance).

4.6.3 Edges on metal toys

Accessible metal edges, including those of holes and slots, on toys intended for children under 97 months shall be free of hazardous burrs and feathering or shall be hemmed, rolled or curled (see Figure 1) or shall incorporate a permanently affixed protective equipment or finish.

Regardless of the manner in which edges are finished, they shall be subject to the sharp edge test as given in 5.8.

4.6.4 Edges on moulded toys

Accessible edges, corners or mould parting areas of moulded toys intended for children under 97 months shall be free of hazardous sharp edges produced by burrs and flash or so protected that hazardous sharp edges are not accessible.

4.6.5 Edges on exposed bolts or threaded rods

Accessible ends of threaded bolts or threaded rods shall be free of sharp edges and burrs, or the ends shall be covered by smooth protective caps so that sharp edges and burrs are not accessible. Any protective caps that are used shall be subjected to the compression test in 5.24.7, regardless of whether or not the protective cap is accessible to flat-surface contact during the appropriate test(s) in 5.24 (reasonably foreseeable abuse tests). Protective caps shall also be subjected to 5.24.5 (torque test) followed by 5.24.6.1 (tension test).

4.7 Points (see E.12)

4.7.1 Accessible sharp points

- a) Accessible points on toys intended for children under 97 months, shall not be hazardous sharp points when tested according to 5.9 (sharp point test).

If an accessible point fails the sharp point test as given in 5.9, the point shall be assessed to determine whether it presents an unreasonable risk of injury taking into account the foreseeable use and intended age grade of the toy.

Points of pencils and similar drawing implements are not considered as sharp points

- b) Potentially sharp points shall be considered non-accessible if they lie adjacent to a surface of the test sample and any gap between the point and the adjacent surface does not exceed 0,5 mm.

- c) Points, on toys intended for children up to and including 36 months, whose largest cross-sectional dimension is 2 mm or less and that do not necessarily present a sharp point when tested in accordance with 5.9, are considered to be potentially hazardous sharp points. They shall therefore be assessed to determine whether they present an unreasonable risk of injury, taking into account the foreseeable use and intended age grade of the toy.

4.7.2 Functional sharp points

- a) Toys intended for children up to and including 36 months shall not have accessible hazardous functional sharp points.
- b) Toys intended for children from 37 months up to and including 96 months that by reason of their function necessarily present the hazard of sharp points and that do not have any non-functional sharp points are exempt from 4.7.1 (e.g. a toy sewing machine with a needle) provided that the packaging carries a warning (see C.2.12 for guidance).

4.7.3 Wooden toys

The accessible surfaces and edges of wood used in toys shall be free of splinters.

4.8 Projections (see E.13)

If a projection presents a potential skin puncture hazard, the projection shall be protected by suitable means, such as turning back the end of a wire, or by affixing a smoothly finished protective cap or cover, which effectively increases the surface area for potential contact with the skin. The protective cap or cover shall not become detached when tested according to 5.24.6.4 (tension test for protective components).

Toys intended to be repeatedly assembled and taken apart shall have the individual pieces and fully assembled articles, as shown on packaging graphics, instructions or other advertising, evaluated separately.

The requirements for the assembled toy do not apply to toys where the assembling makes up a significant part of the play value of the toy.

Since this requirement relates to hazards arising from a child falling onto a toy, only vertical or nearly vertical projections are required to be evaluated. The toy shall be tested in its most onerous position. Corners of structures do not fall under this category.

4.9 Metal wires and rods (see E.14)

- a) Metal wires or other metal materials used for stiffening or for retention of form in toys shall not fracture to produce a hazardous sharp point, hazardous sharp edge or projection hazard when tested in accordance with 5.24.8 (flexure test), if the component can be bent through a 60° arc by the applicable force.
- b) The ends of spokes on toy umbrellas shall be protected. If the protection is removed when tested according to 5.24.6.4 (tension test for protective components) the ends of the spokes shall be free from sharp edges and sharp points when tested in accordance with 5.8 (sharp edge test) and 5.9 (sharp point test). Furthermore, if the protective components are removed by the tension test, the spokes shall have a minimum diameter of 2 mm and the ends shall be smooth, rounded and approximately spherical with no burrs.

4.10 Plastic film or plastic bags in packaging and in toys (see E.15)

The following are exempted from the requirements in 4.10:

- bags which have an opening perimeter of less than 360 mm;
- bags which have an opening perimeter of 360 mm or more and in which the combined depth and opening perimeter is less than 584 mm;
- shrink film of less than 0,038 mm nominal thickness that is in the form of an overwrap that would normally be destroyed when the packaging is opened.

Flexible plastic film or flexible plastic bags without backing and of dimensions greater than 100 mm × 100 mm and used in toys shall either:

- a) have a nominal thickness of 0,038 mm or greater, but shall never be less than 0,036 mm thick when tested according to 5.10 (determination of thickness of plastic film and sheeting), or
- b) have perforations with well-defined holes (where material has been removed) of 1 % minimum area on any maximum area of dimensions 30 mm × 30 mm.

For plastic balloons, the thickness requirement in a) applies to double layers of plastic sheeting (i.e. the thickness is measured without inflating or destroying the balloon).

4.11 Cords and elastics (see E.16)

4.11.1 Cords and elastics in toys intended for children up to and including 18 months

The free length of cords or elastics that can tangle to form a loop or a fixed noose, included with or attached to toys, shall be less than 220 mm in length when measured under a tension of 25 ± 2 N.

If cords or elastics or multiple cords or elastics can tangle and/or form a noose or a fixed loop in connection with any part of the toy, including beads or other attachments on the ends of cord or elastics, the perimeter of the noose or the fixed loop shall be less than 360 mm when measured under a tension of $25 \text{ N} \pm 2 \text{ N}$.

Cords and elastics on toys shall have a mean thickness (smallest dimension) of 1,5 mm or more when measured in accordance with 5.11.1. This does not apply to ribbons.

4.11.2 Self-retracting pull-cords in toys intended for children up to and including 18 months

Accessible cords used in cord-activated mechanisms shall not retract more than 6,4 mm when tested according to 5.11.2 (self-retracting pull-cords).

4.11.3 Cords for pull toys intended for children up to and including 36 months

Cords and elastics for pull toys intended for children up to and including 36 months, with a length of more than 220 mm when measured under a tension of $25 \text{ N} \pm 2 \text{ N}$, shall not be provided with beads or other attachments that could tangle to form a noose or a fixed loop.

4.11.4 Cords on toy bags

Toy bags made of impermeable material with an opening perimeter greater than 360 mm shall not have a drawstring or a cord as a means of closing (see also 4.10).

4.11.5 Crib or playpen toys and mobiles

Mobiles intended to be attached to a crib or playpen shall be accompanied by instructions that draw attention to the hazard of not removing the mobile when the baby begins to push up on hands and knees. Instructions shall also include directions for correct assembly (see C.2.7 and C.3.2 for guidance).

Design guidelines for toys intended for attachment to cribs and playpens are given in annex D.

4.11.6 Crib gyms and similar toys

Crib gyms, including crib exercisers, and similar toys intended to be strung across a crib playpen or perambulator shall be accompanied by instructions that draw attention to the hazard of not removing the gym when the baby begins to push up on hands and knees. Instructions shall also include directions for correct assembly (see C.2.10 and C.3.3 for guidance).

Design guidelines for toys intended for attachment to cribs and playpens are given in annex D.

4.11.7 Cords, strings and lines for flying toys

Hand-held cords, strings and lines over 1,8 m long, attached to toy kites or other flying toys, shall have an electrical resistance of more than $10^8 \Omega/\text{cm}$ when tested in accordance with 5.11.3 (electrical resistance of cords).

Toy kites and other flying toys shall carry a warning (see C.2.16 for guidance).

4.12 Folding mechanisms

4.12.1 Toy pushchairs, perambulators and similar toys (see E.17)

The requirements in 4.12.1 do not apply to toys with a potential sitting surface width of less than 140 mm.

Toy pushchairs, strollers, perambulators and similar toys with folding and sliding mechanisms shall conform to the following requirements:

- a) Toys with a handle or other structural member which can fold down over a child:

Such toys shall have at least one main locking device and at least one secondary locking device, both of which act directly on the folding mechanism.

At least one of the locking devices shall automatically engage when the toy is erected.

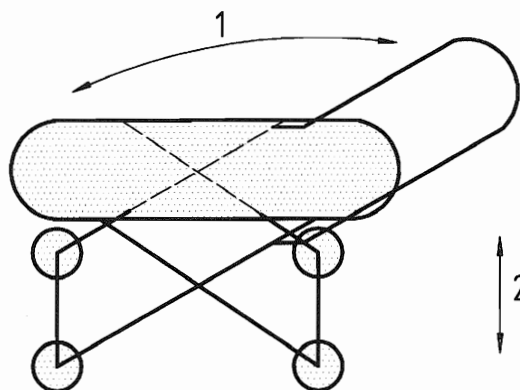
When tested in accordance with 5.22.2 (toy pushchairs and perambulators), the toy shall not collapse and neither of the locking devices shall fail or disengage.

Two devices of the same construction (e.g. locking rings), one on the left-hand side and one on the right-hand side of the toy, are considered to be one locking device.

If it is possible to partially erect a toy pushchair or perambulator without one of the locking devices being engaged, the test given in 5.22.2 shall be conducted in this orientation.

NOTE Partially erect means erected in such a way that the user might wrongly believe the toy to be fully erect.

An example of a toy pushchair or perambulator covered by item a) is illustrated in Figure 8.



Key

- 1 Direction of handle movement
- 2 Direction of chassis movement

Figure 8 — Toy pushchair or perambulator covered by item a) of 4.12.1

- b) Toy pushchairs and perambulators that do not present a hazard of a handle or other structural member folding down over a child:

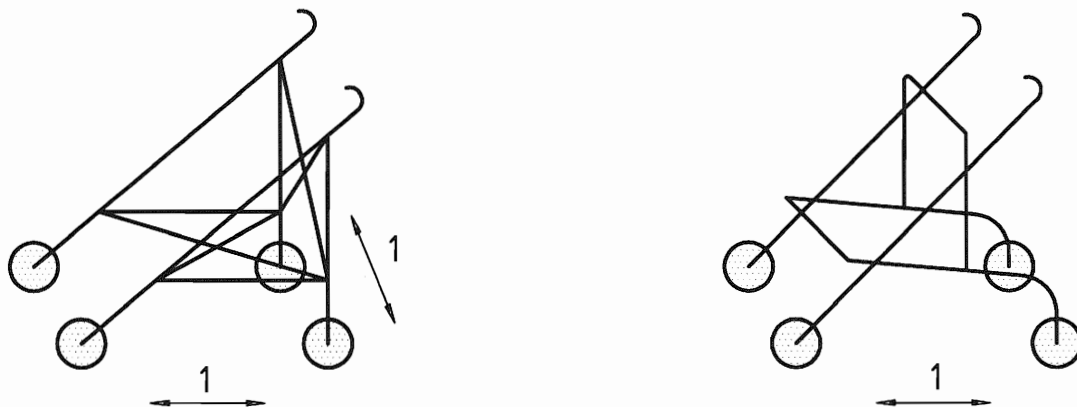
Such toys shall have at least a locking device or a safety stop, which may be manual in operation.

When tested according to 5.22.2 (toy pushchairs and perambulators), the toy shall not collapse and the locking device or safety stop shall not fail or disengage.

If it is possible to partially erect a toy pushchair or perambulator without a locking device being engaged, the test of 5.22.2 shall be conducted in this orientation (see note).

NOTE Partially erect means erected in such a way that the user might wrongly believe the toy to be fully erect.

Examples of toy pushchairs and perambulators covered by item b) are illustrated in Figure 9.



Key

- 1 Direction of chassis movement

Figure 9 — Toy pushchairs covered by item b) of 4.12.1

4.12.2 Other toys with folding mechanisms (see E.18)

Play furniture and other toys in which a folding mechanism, arm or brace is capable of supporting a child or a comparable mass shall either

- have a safety stop or locking device to prevent unexpected or sudden movement or collapse of the toy. The toy shall not collapse when tested in accordance with 5.22.3 (other toys with folding mechanism), or
- have adequate clearance between moving parts to protect the fingers and toes against crushing or laceration in the event of sudden movement or collapse of the toy. If it is possible to insert a 5 mm diameter rod between moving parts, it shall also be possible to insert a 12 mm diameter rod.

4.12.3 Hinge-line clearance (see E.19)

Toys having a gap or clearance along the hinge line between a stationary portion and a movable portion that weighs more than 0,25 kg, shall be so constructed that if the accessible gap at the hinge line will admit a 5 mm diameter rod, it shall also admit a 12 mm diameter rod at all positions of the hinge.

4.13 Holes, clearances and accessibility of mechanisms

4.13.1 Circular holes in rigid materials (see E.20)

For toys intended for children up to and including 60 months, if an accessible circular hole in any rigid material less than 1,58 mm in thickness can admit a 6 mm diameter rod to a depth of 10 mm or greater, it shall also admit a 12 mm diameter rod.

4.13.2 Accessible clearances for movable segments (see E.21)

For toys intended for children up to and including 96 months, if accessible clearances for movable segments can admit a 5 mm diameter rod, they shall also admit a 12 mm diameter rod.

4.13.3 Chains or belts in ride-on toys (see E.22)

Power transmission chains and belts in ride-on toys shall be shielded to make them inaccessible (see Figure 10). It shall not be possible to remove the shield without the use of a tool.

4.13.4 Other driving mechanisms (see E.23)

Clockwork, battery-operated, inertial, or other power-driven mechanisms in toys shall be so enclosed that they do not expose accessible sharp edges or sharp points or otherwise present a hazard of crushing the fingers or other parts of the body.

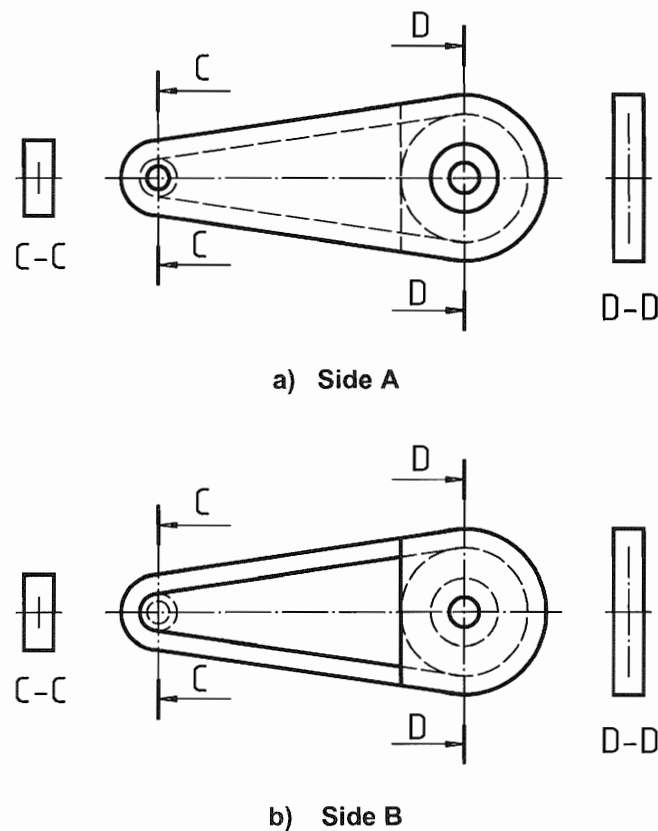


Figure 10 — Propelling chains and chain shields

4.13.5 Winding keys (see E.24)

This requirement applies to toys intended for children up to and including 36 months that use winding keys that rotate as the mechanism unwinds. The requirement applies to keys with flat plates attached to the stem, and which protrude from a rigid surface of the body of the toy.

If the clearance between the flukes of the key and the body of the toy can admit a 5 mm diameter rod, it shall also admit a 12 mm diameter rod at all positions of the key. For keys covered by this requirement, there shall be no opening in the flukes of the key which can admit a 5 mm diameter rod.

4.14 Springs (see E.25)

Springs shall comply with the following:

- a) Spiral springs shall not be accessible if the gap between two consecutive spirals is greater than 3 mm in any position of use.
- b) Extension helical springs shall not be accessible if the gap between two consecutive turns is greater than 3 mm when the spring is subjected to a tensile force of 40 N.

This requirement does not apply to springs that do not essentially return to their original position after unloading.

- c) Compression helical springs shall not be accessible if the gap between two consecutive turns is greater than 3 mm at rest and the spring, when the toy is used, can be subjected to a compression force of 40 N or more.

This requirement does not apply to springs that do not essentially return to their original position after loading with a force of 40 N, nor to springs wound around a second component of the toy (for example a guiding rod) so that it is not possible to insert the accessibility probe A (see 5.7) between consecutive coils further than 5 mm.

4.15 Stability and overload requirements

4.15.1 Stability of ride-on toys and seats

The requirements in 4.15.1.1 to 4.15.1.3 apply to ride-on toys and stationary toys with seats, such as play furniture intended for children up to and including 60 months. Ride-on toys of spherical, cylindrical or other shape that do not normally have a stable base (for example toy bicycles and similar toys) are not covered by these requirements.

4.15.1.1 Sideways stability, feet available for stabilization (see E.26)

Ride-on toys and stationary toys with seats, where the height of the seat from the ground is 27 cm or more and where the feet and/or legs of the child are unrestricted in their sideways motion and thus are available for stabilization, shall not tip when tested in accordance with 5.12.2 (stability test, feet available for stabilization).

4.15.1.2 Sideways stability, feet unavailable for stabilization (see E.26)

Ride-on toys and stationary toys with seats, where the feet and/or legs of the child are restricted in their sideways motion, such as by the enclosed sides of a toy automobile, shall not tip when tested in accordance with 5.12.3 (stability test, feet unavailable for stabilization).

4.15.1.3 Fore and aft stability (see E.27)

Ride-on toys and stationary toys with seats, where the rider cannot easily use his/her legs for stabilization, shall not tip forward or backward when tested in accordance with 5.12.4 (fore and aft stability test).

4.15.2 Overload requirements for ride-on toys and seats (see E.28)

Ride-on toys, stationary toys with seats and toys designed to support all or part of the mass of the child shall not collapse when tested in accordance with 5.12.5 (overload test for ride-on toys and seats) and 5.24.4 (dynamic strength test for wheeled ride-on toys).

NOTE Manufacturers are recommended to consider the strength of the seat and seat pillar under dynamic conditions.

4.15.3 Stability of stationary floor toys (see E.29)

Stationary floor toys greater than 760 mm in height and weighing more than 4,5 kg shall not tip when tested in accordance with 5.12.6 (stability test of stationary floor toys).

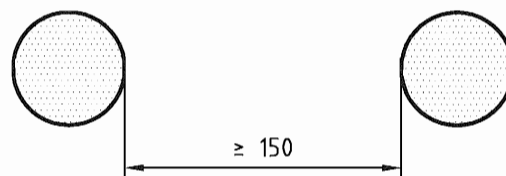
4.16 Enclosures (see E.30)

4.16.1 Ventilation

Any toy, made of impermeable material and having a door or lid, which encloses a continuous volume greater than $0,03 \text{ m}^3$ and in which all internal dimensions are 150 mm or more, shall provide means for breathing by the incorporation of unobstructed ventilation openings. These ventilation openings shall consist of a minimum of either two openings, each having a total area of at least 650 mm^2 and placed at least 150 mm apart or one opening that is the equivalent of the two 650 mm^2 openings expanded to include the separation area (see Figure 11).

The ventilation opening shall remain unobstructed when the toy is placed on the floor in any position and adjacent to two vertical plane surfaces meeting at a 90° angle, so as to simulate the corner of a room. If a permanent partition or bars (two or more) effectively limit the continuous space by making the largest internal dimension less than 150 mm, the ventilation opening shall not be required.

Dimensions in millimetres



a) Total ventilation area $\geq 1\,300 \text{ mm}^2$



b) Alternative equivalent ventilation area $\geq 1\,300 \text{ mm}^2$

Figure 11 — Example of an equivalent single ventilation opening

4.16.2 Closures

4.16.2.1 Lids, doors and similar devices

Closures, such as lids, covers and doors or devices similar to enclosures shall not be fitted with automatic locking devices.

Closures shall be of a type that can be opened with a force of 45 N or less when tested in accordance with 5.13.1 (closures).

This requirement notably precludes the use of buttons, zips and similar fastenings on lids, covers and doors.

4.16.2.2 Lid support for toy chests and similar toys

- a) Toy chests and similar toys with vertically opening hinged lids shall be provided with lid-support mechanisms to prevent sudden collapse or dropping of the lid. The lid-support mechanism shall support the lid so that at no position in the arc of travel of the lid, from within 50 mm of the fully closed position through an arc not to exceed 60° from the fully closed position, shall it drop more than 12 mm under the influence of its own mass, except in the last 50 mm of travel. The test shall be conducted in accordance with 5.13.2.1 (lid support).

The lid-support mechanism shall comply with this requirement before and after being subjected to 7 000 opening and closing cycles, as described in 5.13.2.2 (durability test for toy chest lids).

- b) The lid-support mechanism shall not require adjustment by the consumer to ensure adequate lid support nor shall it require adjustment in order to comply with a) above after being cycled in accordance with 5.13.2.2 (durability test for toy chest lids).
- c) The lid and lid-support mechanism shall comply with the requirements in 4.12.
- d) Toy chests shall be accompanied by instructions for proper assembly and maintenance (see C.3.4 for guidance).

4.16.3 Toys that enclose the head

Toys that enclose the head, such as space helmets, and that are made of impermeable material shall provide means for breathing by the incorporation of unobstructed ventilation areas close to the mouth and nose area. These ventilation areas shall consist of a minimum of either two holes, each hole having a total area of at least 650 mm² and placed at least 150 mm apart, or one opening that is equivalent to the two 650 mm² holes expanded to include the separation area (see Figure 11).

4.17 Simulated protective equipment, such as helmets, hats and goggles (see E.31)

All rigid toys that cover the face, such as goggles, space helmets or face shields, when tested in accordance with 5.14 (impact test of toys that cover the face), shall not produce sharp edges, sharp points or loose parts which could enter the eye. This applies to toys with cut-out eye holes as well as items that cover the eyes.

Toys that simulate safety protective equipment and are intended to be worn by children (examples include but are not limited to construction helmets, sports helmets and fire-fighter helmets) and their packaging shall carry a warning (see C.2.11 for guidance).

4.18 Projectile toys (see E.32)

4.18.1 General

Projectiles and projectile toys shall conform to the following requirements.

- a) All rigid projectiles shall have a tip radius of not less than 2 mm.

- b) High speed rotors and high speed propellers shall be so designed that the perimeter of the rotor or propeller is in the form of a ring in order to reduce the risk of injury.

This requirement does not apply to rotors or propellers that fold down when the toy is not activated. However, the tips and leading edges of these type of rotors or propellers shall be made of suitable resilient material.

4.18.2 Projectile toys with stored energy

Projectile toys with stored energy shall conform to the following requirements.

- a) When tested in accordance with 5.15 (kinetic energy of projectiles, bows and arrows), if the maximum kinetic energy of a projectile exceeds 0,08 J
- 1) the projectile shall have a protective tip made of resilient material such that the kinetic energy per unit area of contact shall not exceed 0,16 J/cm²;
 - 2) the protective tip shall either:
 - not become detached from the projectile when tested in accordance with 5.24.5 (torque test) or 5.24.6.4 (tension test for protective components); or
 - if the protective tip becomes detached from the projectile when tested in accordance with 5.24.5 (torque test) or 5.24.6.4 (tension test for protective components), the projectile shall not be able to be launched by the intended discharge mechanism
 - 3) the potential danger of misuse shall be drawn to the attention of the user (see C.2.15 for guidance).
- b) When tested in accordance with 5.15 (kinetic energy of projectiles, bows and arrows), projectiles ejected by a discharge mechanism shall not produce a hazardous sharp edge or a hazardous sharp point.
- c) The discharge mechanism should be so designed that it will not discharge any other type of potentially hazardous improvised projectiles (e.g. pencils, nails, stones) without modification by the user. Where the discharge mechanism is capable of discharging an object other than that provided with the toy, the potential danger of misuse shall be drawn to the attention of the user (see C.2.15 for guidance).

In order to reduce the risk of eye injuries, manufacturers are strongly recommended to design toys so that they are not able to discharge missiles other than those provided with the toy.

- d) Projectiles shall not, whatever their orientation, fit entirely into the small parts cylinder when tested in accordance with 5.2 (small parts test). This requirement applies regardless of the age group for which the toy is intended.

4.18.3 Projectile toys without stored energy

Projectile toys without stored energy shall conform to the following requirements:

- a) Where the projectile is in the form of an arrow or dart, the projectile shall either
- 1) include a protective tip that is integral with the front end of the shaft; or
 - 2) have a blunted front end to which a protective tip is attached.
- b) The protective tip shall have a contact area of at least 3 cm² and, unless it is reliant on magnetic forces, the tip shall be made from suitable resilient material.
- c) When tested in accordance with 5.24.5 (torque test) or 5.24.6.4 (tension test for protective components); either
- 1) the protective tip shall not become detached from the projectile
- or

- 2) if the protective tip becomes detached from the projectile, the projectile shall not be able to be launched by the intended launch method.
- d) For a bow and arrow set, if the maximum kinetic energy of the arrows exceed 0,08 J when tested in accordance with 5.15 (kinetic energy of projectiles, bows and arrows), the kinetic energy per unit area of contact shall not exceed 0,16 J/cm².
- e) The potential danger of misuse shall be drawn to the attention of the user (see C.2.15 for guidance).

4.19 Aquatic toys (see E.33)

All air inlets of inflatable aquatic toys shall have non-return valves with stoppers permanently attached to the toy.

When the toy is inflated, the stopper must be capable of being pushed into the toy so that it does not stand more than 5 mm from the surface of the toy.

Advertising copy or graphics shall not state or imply that the child will be safe with such a toy if left unsupervised.

Aquatic toys shall carry a warning that the product is not a life-saving device (see C.2.6 for guidance).

4.20 Braking (see E.34)

Braking requirements in a) and b) below do not apply to:

- toys where the hands or feet provide the motive power to the driving wheel or wheels via direct transmission (e.g. pedal cars, tricycles);
 - electrically propelled ride-on toys which are propelled at a maximum speed of 1 m/s unloaded, having a seat height of less than 300 mm and in which the feet are free;
 - toy bicycles (see 4.21.3).
- a) Mechanically or electrically propelled ride-on toys with a free-wheeling facility in accordance with 5.16.1 (determination of free-wheeling facility)
- shall have a braking device;
 - when tested in accordance with 5.16.2 (brake performance for mechanically or electrically powered ride-on toys other than toy bicycles) shall not move more than 5 cm;
 - for such toys which have a mass of 30 kg or more, it shall be possible to lock the brake (parking brake).
- b) Electrically propelled ride-on toys shall be operated by means of a switch which cuts off the power automatically when it is released, without tilting the toy. Application of the brakes shall cut power automatically to the drive.

4.21 Toy bicycles (see 4.13.3 and E.35)

NOTE Requirements for bicycles with a maximum saddle height between 435 mm and 635 mm are given in ISO 8098.

4.21.1 Instructions for use

Toy bicycles shall be accompanied by assembly and maintenance instructions. The potential dangers of riding toy bicycles and precautions to be taken shall be brought to the attention of the parents or carers (see C.2.17 for guidance).

4.21.2 Determination of maximum saddle height

The seat pillar shall have a permanent mark that indicates the minimum insertion depth of the pillar into the frame. The minimum insertion mark shall be positioned at a distance equal to or greater than two and a half times the diameter of the pillar measured from the bottom of the full diameter of the pillar, and shall not affect the seat pillar strength.

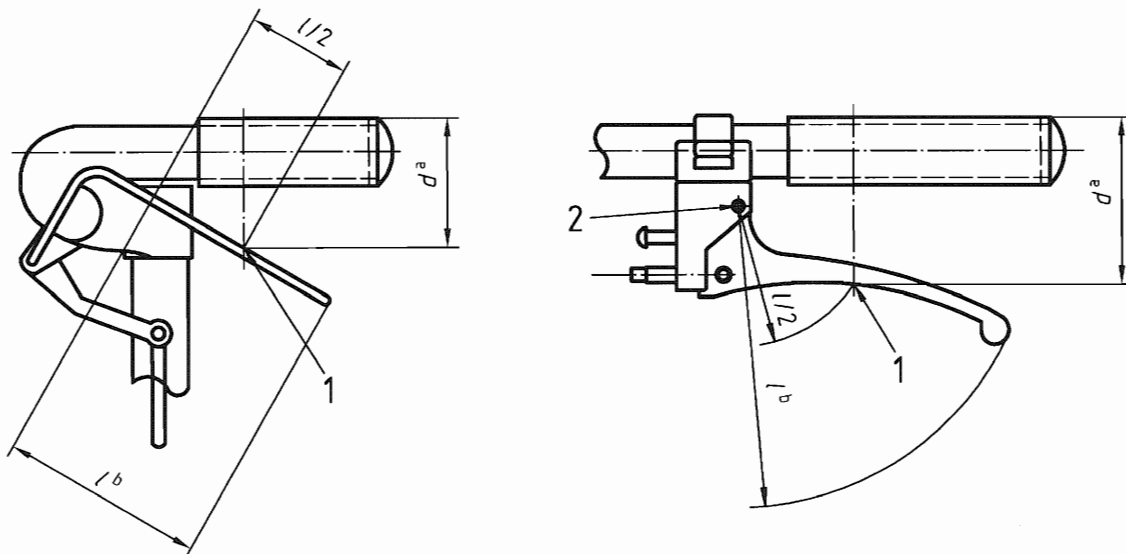
4.21.3 Braking requirements

Toy bicycles with a free-wheeling facility in accordance with 5.16.1 shall be equipped with a braking system which operates on the rear wheel.

For handbrakes, the brake lever dimension d measured at the midpoint of the lever as shown in Figure 12 shall not exceed 60 mm. The range of adjustment on an adjustable lever shall permit this dimension to be attained. The lever length (l) shall be ≥ 80 mm.

When tested in accordance with 5.16.3 (brake performance for toy bicycles), the toy shall not move more than 5 cm.

Dimensions in millimetres



Key

- 1 Midpoint of lever
- 2 Pivot
- a Brake lever dimension
- b Lever length

Figure 12 — Handbrake lever dimensions

4.22 Speed limitation of electrically driven ride-on toys (see E.36)

Electrically driven ride-on toys shall have a maximum speed of 8 km/h when tested in accordance with 5.17.

4.23 Toys containing a heat source

This requirement does not cover burners in chemistry sets or related experimental kits and light bulbs and similar items.

When tested in accordance with 5.18 (determination of temperature rises):

- a) toys containing a heat source shall not ignite when used at the maximum input;
- b) the rise in temperature of handles, knobs and similar parts which are likely to be touched by hand shall not exceed the following values:
 - parts made of metal 25 K
 - parts made of glass or porcelain 30 K
 - parts made of plastics or wood 35 K
- c) the rise in temperature of other accessible parts of the toy shall not exceed the following values:
 - parts made of metal 45 K
 - parts made of other materials 55 K

4.24 Liquid-filled toys (see E.37)

Upon completion of any relevant tests in accordance with clause 5, liquid-filled toys with non-accessible liquid shall be tested according to 5.19 (leakage of liquid-filled toys) and there shall be no leakage of the contents which would result in a potential hazard.

Liquid-filled teethingers and liquid-filled teething toys shall be marked with a warning not to be placed in a freezer compartment (see C.3.5 for guidance).

4.25 Mouth-actuated toys (see E.38)

Mouth-actuated toys shall conform to the following requirements.

- a) Mouth-actuated toys and removable mouthpieces of mouth-actuated toys shall not fit entirely in the small parts cylinder when tested in accordance with 5.2 (small parts test).
- b) Non-detachable mouthpieces of mouth-actuated toys, if detached when tested in accordance with 5.24.5 (torque test) and 5.24.6.1 (tension test — general), shall not fit entirely in the small parts cylinder when tested in accordance with 5.2 (small parts test).
- c) Mouth-actuated toys which contain loose components such as spheres in a whistle or reeds in a noisemaker shall not, when tested in accordance with 5.20 (durability of mouth-actuated toys), release any objects that fit entirely in the small parts cylinder when tested in accordance with 5.2 (small parts test).
- d) Removable or non-detachable mouthpieces fitted to balloons shall conform to the requirements in items a) and b) (see also 4.5.6).

4.26 Toy roller skates and toy skateboards

Toy roller skates and toy skateboards are products that are intended for children with a maximum mass of 20 kg.

Toy roller skates and toy skateboards shall carry a warning advising that protective equipment be worn (see C.2.14 for guidance).

4.27 Percussion caps (see E.39)

Assuming reasonably foreseeable use, percussion caps specifically designed for use in toys shall not produce flames, glowing parts or other debris which are potential eye injury hazards.

The packaging of percussion caps shall carry a warning (see C.2.18 for guidance).

5 Test methods

5.1 General

The test methods specified in clause 5 shall be used to determine the compliance of toys with the requirements of this part of ISO 8124.

The tests in 5.2 through 5.23 apply to particular types of toys as specified in the requirements of clause 4.

The objective of the tests in 5.24 is to simulate reasonably foreseeable abuse and damage to which the toys may be subjected. The test methods are for use in exposing potential hazards that would result from the reasonably foreseeable abuse and damage of toys intended for children.

Certain test methods have been established for ages

- from birth up to and including 18 months
- from 19 months up to and including 36 months and
- from 37 months up to and including 96 months of age.

If a toy is marked, labelled, advertised or otherwise intended for children of ages spanning more than one of these age groups, the toy shall be subjected to the test(s) providing the most stringent requirements.

If a toy or its packaging is not age-labelled in a clear and conspicuous manner, or (based on such factors as marketing practices and the customary patterns of usage of a toy by children) is inappropriately age-labelled and is intended or appropriate for children up to and including 96 months, it shall also be subjected to the most stringent test requirements.

If during a test the toy has been materially affected, e.g. by a clamp or similar test equipment, further relevant testing shall be carried out on a new toy.

Unless otherwise specified in the test method, each sample shall, prior to testing, be subjected to a temperature of $21\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ for at least 4 h. Textile toys and textile soft-filled (stuffed) toys shall be conditioned at a temperature of $21\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and $65\% \pm 10\%$ relative humidity for at least 4 h. The testing shall commence within 5 min after the toy has been removed from the preconditioning atmosphere.

Toys reasonably intended to be assembled by an adult and not intended to be taken apart by a child shall be tested only in the assembled state if the packaging and the assembly instructions prominently indicate that the article is to be assembled only by an adult.

In situations where a test procedure may be applied in more than one way to a toy test component, the point (or direction) of force (or torque) application which results in the most onerous conditions shall be used.

5.2 Small parts test (see 4.3.2, 4.4, 4.18.2 and 4.25)

Place the toy, without compressing it and in any orientation, into the cylinder as shown in Figure 13.

Repeat the procedure with any removable component of the toy and any component liberated after testing according to 5.24 (reasonably foreseeable abuse tests).

Determine whether the toy or any removable component or liberated component fits entirely within the cylinder.

Dimensions in millimetres

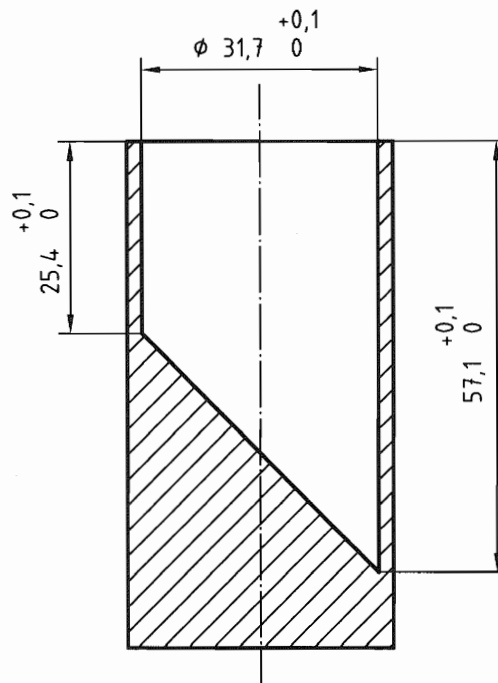


Figure 13 — Small parts cylinder

5.3 Test for shape and size of certain toys (see 4.5.1)

Position and clamp the test template A shown in Figure 14 so that the axis of the slot is essentially vertical and the slot is unobstructed at its top and bottom openings.

Orientate the toy to be tested in a position which would most likely permit the entry of the toy through the slot in the test template. Place the toy in the slot in the orientation stated so that the force on the toy is only the force due to its mass.

Determine whether any part of the toy penetrates past the full depth of the cavity of the test template.

Repeat the procedure for toys with nearly spherical, hemispherical or circular flared ends using supplemental test template B shown in Figure 15, except that only the spherical, hemispherical or circular flared ends shall be presented to the template.

Dimensions in millimetres

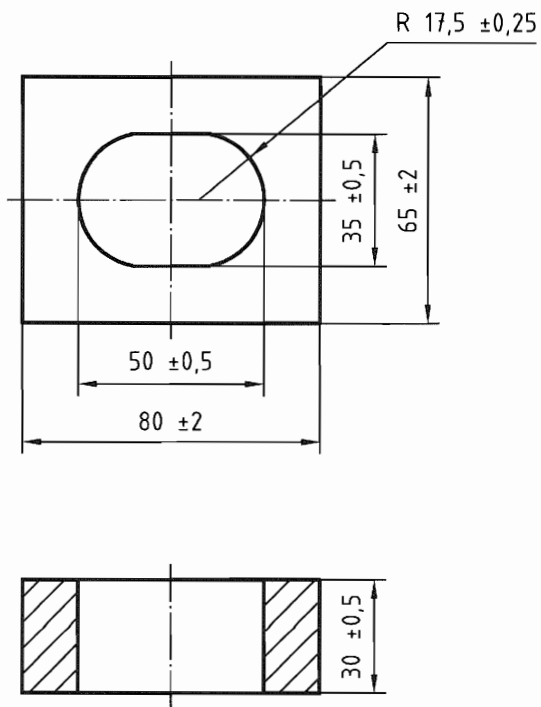


Figure 14 — Test template A

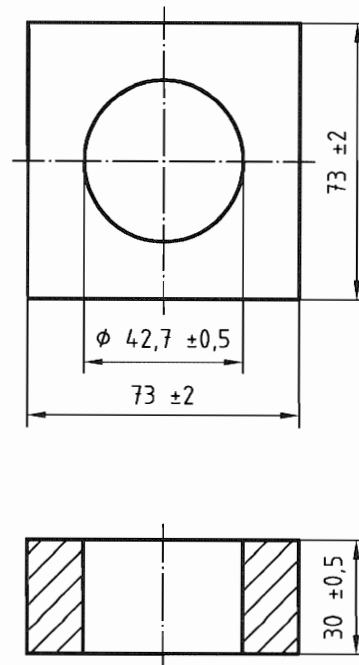


Figure 15 — Supplemental test template B

5.4 Small balls test (see 4.5.2)

Position and clamp the test template C shown in Figure 16 so that the axis of the slot is essentially vertical and the slot is unobstructed at its top and bottom openings.

Dimensions in millimetres

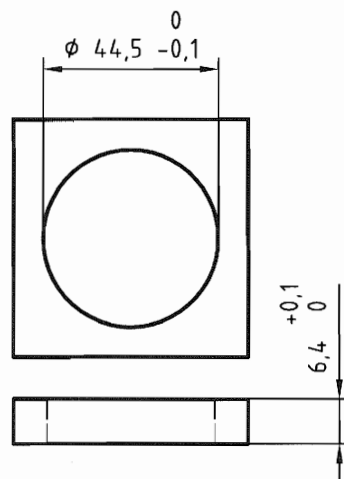


Figure 16 — Test template C

Orientate the ball to be tested in a position which would most likely permit the entry of the ball through the slot in the test template. Place the ball in the slot so that the force on the toy is only the force due to its mass.

Determine whether the ball passes entirely through the test template.

5.5 Test for pompoms (see 4.5.3)

Position and clamp the test template C shown in Figure 16 so that the axis of the slot is essentially vertical and the slot is unobstructed at its top and bottom openings.

Orientate the pompom to be tested in a position which would most likely permit the entry of the pompom through the slot in the test template and put the free ends of fibres into the template first. Place the pompom in the slot so that the force on the toy is only the force due to its mass.

Determine whether the pompom passes entirely through the test template.

5.6 Test for preschool play figures (see 4.5.4)

Position and clamp the supplemental test template B shown in Figure 15 so that the axis of the slot is substantially vertical and the slot is unobstructed at its top and bottom openings.

Orientate the play figure to be tested in a position which would most likely permit the entry of the rounded end through the slot in the test template. Place the toy in the slot so that the force on the toy is only the force due to its mass.

Determine whether the rounded end penetrates past the full depth of the cavity of the test template.

5.7 Accessibility of a part or component (see 4.6, 4.7, 4.13, 4.14 and A.2.3)

5.7.1 Principle

An articulated probe is manoeuvred to the part or component being tested. If any portion forward of the collar contacts the part or component, that part or component is considered to be accessible.

5.7.2 Apparatus

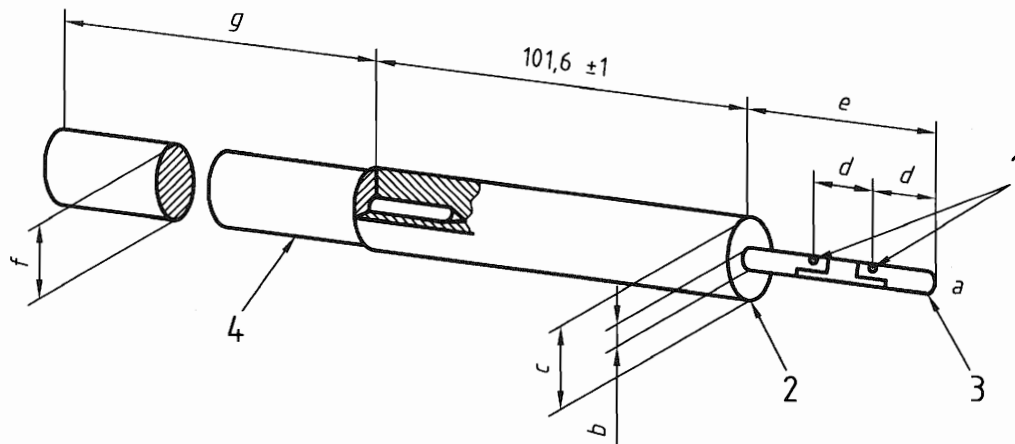
5.7.2.1 Articulated accessibility probe, as specified in Table 1 and illustrated in Figure 17, manufactured from rigid material.

The tolerance on the dimensions shall be $\pm 0,1$ mm except for *f* and *g* which have a tolerance of ± 1 mm.

Table 1 — Dimensions of accessibility probes (see Figure 17)

Age grading ^a	Probe	Dimensions						
		mm						
		(a)	b	c	d	e	f	g
Up to and including 36 months	A	2,8	5,6	25,9	14,7	44,0	25,4	464,3
37 months and over	B	4,3	8,6	38,4	19,3	57,9	38,1	451,6

^a Toys intended for children spanning both age groups should be tested using both probes.

**Key**

- 1 Pivot points
- 2 Collar
- 3 Hemisphere (a)
- 4 Extension

Figure 17 — Accessibility probe (see Table 1)**5.7.3 Procedure**

Remove all components on the toy that are intended to be removed without the use of a tool.

Where a tool is intended to be used in conjunction with the toy, all the components on the toy that are capable of being removed by that tool should be removed.

Manoeuvre, as described in a) through c) below, the appropriate articulated accessibility probe in any convenient position, towards the part or component of the toy being tested. Each probe joint may be rotated up to 90° to simulate knuckle movement. If necessary, pivot the probe at any of its joints in the attempt to contact the part or component of the toy.

NOTE 1 Where the part is a sharp point that lies adjacent to a plane surface such that the gap between the point and the surface is 0,5 mm or less, the point is considered to be non-accessible and the procedure specified in b) need not be carried out.

- a) For any hole, recess or other opening having a minor dimension (see note 2) smaller than the collar diameter of the appropriate probe, insert the probe such that the total insertion depth for accessibility is up to the collar.

NOTE 2 The minor dimension of an opening is the diameter of the largest sphere that will pass through the opening.

- b) For any hole, recess or other opening having a minor dimension larger than the collar diameter of probe A but less than 187 mm when probe A is used, or a minor dimension larger than the collar diameter of probe B but less than 230 mm when probe B is used, determine the total insertion depth for accessibility by inserting the appropriate probe, with the extension shown in Figure 17, in any direction for a distance up to 2,25 times the minor dimension of the hole, recess or opening, measured from any point in the plane of the opening.
- c) For any hole, recess or other opening having a minor dimension of 187 mm or larger when probe A is used, or a minor dimension of 230 mm or larger when probe B is used, the total insertion depth for accessibility is unrestricted unless other holes, recesses or openings within the original hole, recess or opening are encountered that have dimensions conforming to a) or b) of this clause; in such instances follow the procedure in a) or b) as appropriate. If both probes are to be used, a minor dimension of 187 mm or larger shall determine the unrestricted access.

Determine whether a tested part or component can be contacted by any portion of the accessibility probe forward of the collar.

5.8 Sharp edge test (see 4.6 and 4.9)

5.8.1 Principle

A self-adhesive tape is attached to a mandrel which is then rotated for a single 360° revolution along the accessible edge being tested. The tape is then examined for the length of cut.

5.8.2 Apparatus

The apparatus shall be as illustrated in Figure 18.

5.8.2.1 Mandrel, made of steel

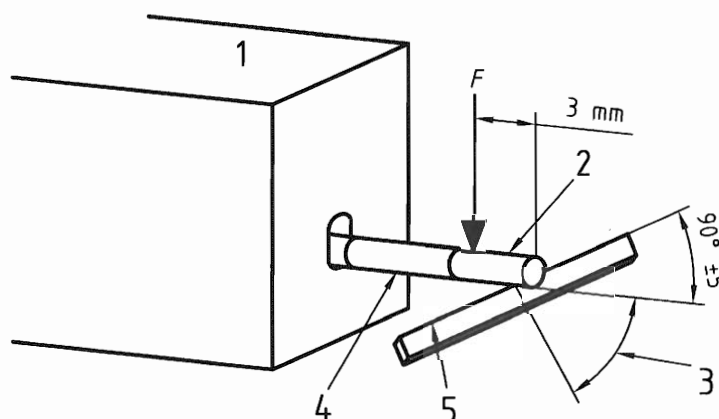
The test surface of the mandrel shall be free of scratches, nicks or burr and shall have a surface roughness R_a not greater than $0,40 \mu\text{m}$ when measured in accordance with ISO 4287-2. This surface shall have a Rockwell C scale hardness of not less than 40 when measured in accordance with ISO 6508-1. The diameter of the mandrel shall be $9,35 \text{ mm} \pm 0,12 \text{ mm}$.

5.8.2.2 Device for rotating the mandrel and applying a force to it

The device shall be capable of rotating the mandrel at a constant tangential velocity of $23 \text{ mm/s} \pm 4 \text{ mm/s}$ during the central 75 % of its 360° travel, starting and stopping of the mandrel being smooth. Portable or non-portable and of any suitable design, the device shall be capable of applying any force up to 6 N to the mandrel, perpendicular to the mandrel axis.

5.8.2.3 Pressure-sensitive polytetrafluoroethylene tape

The thickness of the polytetrafluoroethylene (PTFE) tape shall be between 0,066 mm and 0,090 mm. The adhesive shall be pressure-sensitive silicone polymer with a nominal thickness of 0,08 mm. The width of the tape shall be not less than 6 mm.



Key

- 1 Device, portable or non-portable, to apply a known force F and rotation to the mandrel (see 5.8.2.2)
- 2 Single wrap of PTFE tape (see 5.8.2.3)
- 3 Variable angle to seek worst-case situation (see 5.8.3)
- 4 Mandrel
- 5 Edge under test

Figure 18 — Edge test apparatus

5.8.3 Procedure

Ascertain that the edge to be tested is accessible by the method described in 5.7 (accessibility of a part or component).

Support the toy in such a manner that the accessible edge to be tested does not bend or move when the force of the mandrel is applied. Ensure that the support is not less than 15 mm from the edge to be tested.

If part of the toy has to be removed or disassembled in order to test a particular edge, and as a result, the rigidity of the edge being tested is affected, support the edge so that its stiffness approximates the edge stiffness in the assembled toy.

Wrap the mandrel with one layer of the tape to provide sufficient area for performing the test.

Place the taped mandrel such that its axis is at $(90 \pm 5)^\circ$ to the line of a straight edge, or $(90 \pm 5)^\circ$ to a tangent at the test point of a curved edge, and the tape is in contact with the sharpest part of the edge (i.e. the worst-case situation) when the mandrel is rotated one full revolution (see Figure 18).

Apply a force F of $\left(6 \begin{smallmatrix} 0,0 \\ -0,5 \end{smallmatrix}\right)$ N to the mandrel, 3 mm from the leading edge of the tape, and rotate the mandrel 360° about its axis against the edge, ensuring that no relative motion occurs between the mandrel and the edge during rotation of the mandrel. If this procedure causes the edge to bend, apply the maximum force that will not cause the edge to bend.

Remove the tape from the mandrel without enlarging any cut in the tape or causing any score in the tape to become a cut. Measure the length of tape which has contacted the edge during the test. Measure the length of tape that is cut, including any intermittent cuts.

Calculate the percentage length of the tape which has been cut during the test. If this is more than 50 % of the contact length, the edge is a potentially hazardous sharp edge.

5.9 Sharp point test (see 4.7 and 4.9)

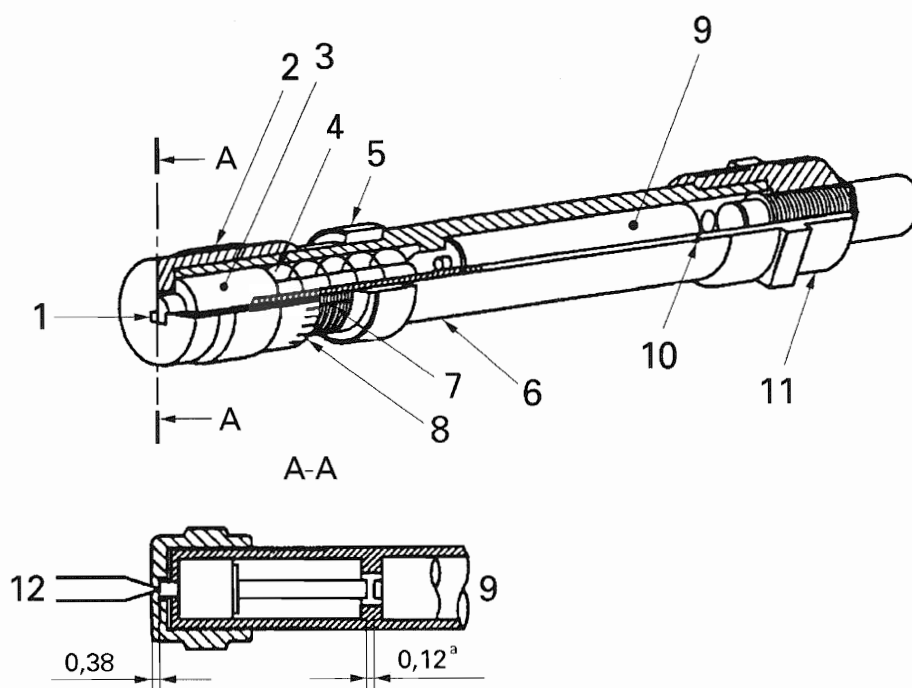
5.9.1 Principle

A point tester is applied to an accessible sharp point and it is observed whether or not the point being tested penetrates a specified distance into the sharp point tester. Depth of penetration of the point being tested determines sharpness. If the point can contact a sensing head that is recessed a distance of $0,38 \text{ mm} \pm 0,02 \text{ mm}$ below the end cap and can move the sensing head a further $0,12 \text{ mm} \pm 0,02 \text{ mm}$ against a $\left(2,5 \begin{smallmatrix} 0 \\ -0,3 \end{smallmatrix}\right)$ N force of a return spring, the point shall be identified as potentially sharp.

5.9.2 Apparatus

5.9.2.1 Point tester (for example as shown in Figure 19)

A gauging slot measuring $1,02 \text{ mm} \pm 0,02 \text{ mm}$ wide by $1,15 \text{ mm} \pm 0,02 \text{ mm}$ long in the end of the slotted cap of the point tester establishes two reference dimensions. The sensing head is recessed $0,38 \text{ mm} \pm 0,02 \text{ mm}$ below the end cap.



Key

- 1 Gauging slot
- 2 Gauging cap
- 3 Sensing head
- 4 Loading spring
- 5 Locking ring
- 6 Barrel
- 7 Adjustment reference mark
- 8 Micrometer divisions
- 9 R03 dry cell
- 10 Electrical contact spring
- 11 Indicator lamp assembly and adaptor nut
- 12 Test point

^a The gap is closed upon insertion of point sufficiently sharp to pass through gauging slot and depress sensing head 0,12 mm. Electrical circuit is thereby completed and indicator test lamp lights. (Sharp point fails test)

Figure 19 — Point tester

5.9.3 Procedure

Ascertain that the point to be tested is accessible by the method described in 5.7 (accessibility of a part or component).

Support the toy to be tested in such a manner that the point does not move during the test. In most cases it will not be necessary to support the point directly; however, if necessary, support at not less than 6 mm from the point to be tested.

If part of the toy has to be removed or disassembled in order to test a particular point, and as a result, the rigidity of the point being tested is affected, support the point so that its stiffness approximates the point stiffness in the assembled toy.

Adjust the point tester by loosening the locking ring and rotating it so that it moves toward the indicator lamp assembly a sufficient distance to expose the calibration reference mark on the barrel. Rotate the gauging cap clockwise until the indicator lamp lights. Rotate the cap anticlockwise until the sensing head moves a distance of $0,12 \text{ mm} \pm 0,02 \text{ mm}$ from making contact with the dry cell, as shown in Figure 19.

NOTE Where the gauging cap includes micrometer markings, the distance may be readily achieved by rotating the cap anticlockwise until the appropriate micrometer marking corresponds with the calibration reference mark. The gauging cap may now be locked in this position by rotating the locking ring until it fits firmly against the cap.

Insert the point, in the most onerous direction, into the cap slot and apply a force of $(4,5 \begin{smallmatrix} 0 \\ -0,2 \end{smallmatrix}) \text{ N}$ to depress the spring as far as possible without shaving the point on the edges of the slot or extruding the point through the slot. If the point being tested penetrates a distance of 0,5 mm or more into the gauging slot, causing the indicator lamp to light, and the point under test maintains its original shape while under a force of $(4,5 \begin{smallmatrix} 0 \\ -0,2 \end{smallmatrix}) \text{ N}$, the test point is a potentially hazardous sharp point.

5.10 Determination of thickness of plastic film and sheeting (see 4.10)

Prepare plastic bags by cutting the sides, without stretching, into two single sheets.

Using a measuring device capable of measuring thickness to an accuracy of $4 \text{ } \mu\text{m}$ in accordance with ISO 4593, measure the thickness of any sheet at ten equidistant points across the diagonal of any $100 \text{ mm} \times 100 \text{ mm}$ area.

Determine whether the thickness complies with the requirements of 4.10 a).

5.11 Test for cords

5.11.1 Determination of cord thickness (see 4.11.1)

Tension the cord under test with a force of $25 \text{ N} \pm 2 \text{ N}$.

Measure the thickness of the cord at three to five locations along its length with a suitable device having an accuracy of $\pm 0,1 \text{ mm}$. For cords approaching 1,5 mm in thickness, use a non-compressible method, e.g. an optical projector.

Calculate the mean thickness of the cord.

Determine whether the thickness complies with the requirements of 4.11.1.

5.11.2 Self-retracting pull cords (see 4.11.2)

Using a suitable clamp, position the toy so that the cord is vertical and the toy is in the most favourable position for retraction. Extend the cord fully and attach a mass of $(0,9 \begin{smallmatrix} +0,05 \\ 0,0 \end{smallmatrix}) \text{ kg}$.

For monofilament cords less than 2 mm in diameter, attach a mass of $(0,45 \begin{smallmatrix} +0,05 \\ 0,0 \end{smallmatrix}) \text{ kg}$.

Determine whether the cord retracts more than 6,4 mm.

5.11.3 Electric resistance of cords (see 4.11.7)

Condition the samples for 7 h minimum at a temperature of $(25 \pm 3) ^\circ\text{C}$ and at a relative humidity of 50 % to 65 % and carry out the test in this atmosphere.

Using an appropriate appliance, determine whether the electric resistance is more than $10^8 \text{ } \Omega/\text{cm}$.

5.12 Stability and overload tests (see 4.15)

5.12.1 General

Where the toy is intended to bear the mass of more than one child at a time, test each sitting or standing area simultaneously.

5.12.2 Stability test, feet available for stabilization (see 4.15.1.1)

Place the toy on a smooth surface inclined $(10^{+0,5}_{0,0})^\circ$ to the horizontal plane.

Turn the steering mechanism, if any, to a position in which the toy is most likely to tip. Chock wheels to restrict rolling, but allow casters to assume their natural position before chocks are applied.

Load the toy on its standing or sitting surface with the appropriate mass in accordance with Table 2.

Table 2 — Load for stability test

Age group	Load kg
Up to and including 36 months	$25 \pm 0,2$
37 months and over	$50 \pm 0,5$

Apply the load so that the major axis is perpendicular to the true horizontal while the toy is on the specified incline. Design the load so that the height of its centre of gravity is $220 \text{ mm} \pm 10 \text{ mm}$ above the seat surface. For all ride-on toys, secure the centre of gravity of the load both $43 \text{ mm} \pm 3 \text{ mm}$ rearward of the front-most portion of the designated seating area, and $43 \text{ mm} \pm 3 \text{ mm}$ forward of the rear-most portion of the designated seating area (note: this involves two separate tests). If there is no designated seating area, place the load at the least favourable position that it is reasonable to anticipate that the child will choose to sit.

Observe whether the toy tips within 1 min after application of the load.

5.12.3 Stability test, feet unavailable for stabilization (see 4.15.1.2)

Perform the test in accordance with 5.12.2 (stability test, feet available for stabilization) except that the slope shall be inclined $(15^{+0,5}_{0,0})^\circ$ to the horizontal plane.

Observe whether the toy tips within 1 min after application of the load.

5.12.4 Fore and aft stability test (see 4.15.1.3)

Ride-on toys shall be tested with the steering wheel, if any,

- a) in a forward position, and
- b) at an angle of approximately 45° to the left of the forward position, and
- c) at an angle of approximately 45° to the right of the forward position.

For rocking horses, displace the toy to the limit of its bow.

Place the toy on a slope of a smooth surface inclined $(15^{+0,5}_{0,0})^{\circ}$ to the horizontal plane. Test the toy facing both up and down the slope.

Load the toy as specified in 5.12.2.

Observe whether the toy tips within 1 min after application of the load.

5.12.5 Overload test for ride-on toys and seats (see 4.15.2)

Place the toy on a horizontal plane.

Load the toy on its standing or sitting surface with the appropriate mass in accordance with Table 3.

Table 3 — Loads for overload test

Age group	Load kg
Up to and including 36 months	$35 \pm 0,3$
37 months up to and including 96 months	$80 \pm 1,0$
97 months and over	$140 \pm 2,0$

Conduct the test for overload requirements so that it will be consistent with the advertised mass capacity of the toy, if that mass is higher than the required load according to Table 3.

Determine whether the toy collapses such that it does not conform to the relevant requirements.

5.12.6 Stability test of stationary floor toys (see 4.15.3)

Place the toy on a slope with a smooth surface inclined $10^{\circ} \pm 1^{\circ}$ to the horizontal plane, with all movable portions extended to their fullest travel, facing down the slope side.

Observe whether the toy tips within 1 min.

5.13 Test for closures and toy chest lids (see 4.16.2)

5.13.1 Closures

With the closure in a closed position, apply a force of $45 \text{ N} \pm 1,3 \text{ N}$ in an outward direction to the inside of the closure perpendicular to the plane of the closure and anywhere within 25 mm from the geometric centre of the closure.

Observe whether the closure opens.

5.13.2 Toy chest lids

Before testing, assemble the toy chest in accordance with the manufacturer's instructions.

5.13.2.1 Lid support

Lift the lid to any position in its arc of travel to a distance greater than 50 mm, but not through an arc of more than 60° from its fully closed position, as measured at the outermost edge of the lid. Release the lid and measure any dropping motion at a point in the approximate centre of the outermost edge of the lid.

Determine whether the lid drops more than 12 mm.

5.13.2.2 Durability test for toy chest lids

Subject the lid to 7000 opening-and-closing cycles, where one cycle consists of raising the lid from its fully closed to its fully open position and returning it to fully closed. To prevent undue stress on screws or other fasteners used to attach the lid support mechanism, care should be taken not to force the lid beyond its normal arc of travel.

The time to complete one cycle shall be approximately 15 s. The 7000 cycles shall be completed within a time period of 72 h, after which the test described in 5.13.2.1 shall be repeated.

Determine whether the toy chest lid and the lid support mechanism still comply with the requirements of 4.16.2.2.

5.14 Impact test for toys that cover the face (see 4.17)

Affix the toy firmly in a suitable clamp with that portion which covers or, in the case of cut-out eye holes, which surrounds the eyes, in a horizontal plane.

Drop a steel ball of diameter 16 mm and mass of $(15^{+0,8}_0)$ g from a height of $130 \text{ cm} \pm 0,5 \text{ cm}$ onto the horizontal upper surface of the toy in the area that would cover the eyes in normal use. In the case of toys with cut-out eye holes, impact the area which would be directly adjacent to the eyes in normal use.

The ball may be guided but not restricted in its fall by being dropped through a perforated tube extending to within approximately 100 mm of the toy.

Determine whether the toy has produced hazardous sharp edges, hazardous sharp points or loose parts which could enter the eye.

5.15 Kinetic energy of projectiles, bows and arrows (see 4.18)

5.15.1 Principle

Calculate the kinetic energy of the projectile, used under normal conditions, from the maximum of five velocity readings.

If more than one type of projectile is supplied with the toy, the kinetic energy of each type of projectile shall be calculated.

For bows, use an arrow intended for the bow and stretch the bow string as far as the arrow allows, but to a maximum of 70 cm.

5.15.2 Apparatus

5.15.2.1 Means for determining the velocity to give a calculated kinetic energy to an accuracy of 0,005 J.

5.15.3 Procedure

5.15.3.1 Determination of kinetic energy

Determine the maximum kinetic energy, E_k , of the projectile in free flight using the following equation:

$$E_k = mv^2/2$$

where

- m is the mass of the projectile, in kilograms;
- v is the velocity of the projectile, in metres per second;
- E_k is the maximum kinetic energy, in joules.

5.15.3.2 Determination of kinetic energy per area of contact

Determine the maximum kinetic energy per area of contact $E_{k, \text{area}}$ using the following equation:

$$E_{k, \text{area}} = mv^2/2A$$

where

- m is the mass of the projectile, in kilograms;
- v is the velocity of the projectile, in metres per second;
- A is the impact area of the projectile, in square centimetres;
- $E_{k, \text{area}}$ is the maximum kinetic energy per area of contact, in joules per square centimetre.

An acceptable method of determining the contact area of a resilient-tipped projectile is to apply a suitable staining or inking agent (e.g. Prussian blue) to the projectile, firing it at a suitable perpendicular surface $300 \text{ mm} \pm 5 \text{ mm}$ away and measuring the area of residual impression. Conversely, if more appropriate, the impact surface may be impressionable (e.g. covered with a carbon paper system) rather than the projectile. Determine the impact area as follows.

- a) Apply a suitable staining or inking agent to the tip of the projectile. Place a sheet of clean white paper on a wooden block. Support the block so it will not move when impacted.

Hold the sheet flat against the block or place a sheet of clean white paper between the wooden block and a sheet of carbon paper (carbon side facing the white paper). Hold the sheets flat against the block.
- b) Load the projectile to be tested into the discharge mechanism. Orientate the loaded discharge mechanism perpendicular to the block surface, with the tip of the projectile $300 \text{ mm} \pm 5 \text{ mm}$ from the block. If the discharge mechanism has more than one speed setting, set to the maximum speed.
- c) Propel the projectile into the paper.
- d) Measure the image area on the white paper. The impact area is the average of a minimum of five measurements.
- e) Calculate the maximum kinetic energy per area of contact.

5.16 Free-wheeling facility and brake performance test

5.16.1 Determination of free-wheeling facility (see 4.20 and 4.21.3)

Load the toy as in 5.12.2 (stability test, feet available for stabilization) with the appropriate mass as given in Table 2 and place it on a horizontal plane.

Pull the toy at a constant speed of $2 \text{ m/s} \pm 0,2 \text{ m/s}$ on a surface covered with aluminium oxide paper P60 and determine the maximum pull force.

The toy is not free-wheeling if

$$F_1 \geq (m + 25) \times 1,7 \text{ or}$$

$$F_2 \geq (m + 50) \times 1,7$$

where

F_1 is the maximum pull force, in newtons, for a toy intended for children up to and including 36 months;

F_2 is the maximum pull force, in newtons, for a toy intended for children 37 months and over;

m is the mass of the toy, in kilograms.

NOTE If a toy accelerates down a slope of 10° when loaded with a mass of 50 kg, it can be expected to be free-wheeling.

5.16.2 Brake performance for mechanically or electrically powered ride-on toys other than toy bicycles (see 4.20)

Load the toy as in 5.12.2 (stability test, feet available for stabilization) with the appropriate mass as given in Table 2 and place it on a plane inclined at $\left(10^{+0,5}_0\right)^\circ$ covered with a surface of aluminium oxide paper P60, with its longitudinal axis parallel to the incline.

Apply a force of $50 \text{ N} \pm 2 \text{ N}$ in the direction in which the brake handle is normally operated.

If the brake is operated by a handle similar to that of a bicycle, apply a force of $30 \text{ N} \pm 2 \text{ N}$ at right angles to the axis of the handle, at the middle of the handle.

If the brake is operated by a pedal, apply a force of $50 \text{ N} \pm 2 \text{ N}$ to the pedal in the operating direction producing the effect of the brake.

If the vehicle has several brakes, test each brake separately.

Determine whether the toy moves more than 5 cm upon application of the braking force.

5.16.3 Brake performance for toy bicycles (see 4.21.3)

Load the toy bicycle with a mass of $50 \text{ kg} \pm 0,5 \text{ kg}$, whose centre of gravity is 150 mm above the surface on which the child sits. Place the toy bicycle on a plane inclined at $\left(10^{+0,5}_0\right)^\circ$ with its longitudinal axis parallel to the incline.

If the brake is operated by a handle similar to that of a bicycle, apply a force of $30 \text{ N} \pm 2 \text{ N}$ at right angles to the axis of the handle, at the middle of the handle.

If the brake is operated by a pedal, apply a force of $50 \text{ N} \pm 2 \text{ N}$ in the operating direction producing the effect of the brake.

Determine whether the toy moves more than 5 cm upon application of the braking force.

5.17 Determination of speed of electrically driven ride-on toys (see 4.22)

Load the toy in its normal sitting or standing position with a mass of $25 \text{ kg} \pm 0,2 \text{ kg}$.

Operate the toy on a horizontal surface and determine whether the maximum velocity exceeds 8 km/h.

5.18 Determination of temperature increases (see 4.23)

In ambient draft-free atmosphere of temperature of $(21 \pm 5) ^\circ\text{C}$, operate the toy according to the instructions for use at the maximum input until equilibrium temperature is reached.

Measure the temperature of the accessible parts and calculate the temperature increases.

Observe whether the toy ignites.

5.19 Leakage of liquid-filled toys (see 4.24)

Condition the toy at a temperature of $(37 \pm 1) ^\circ\text{C}$ for a minimum of 4 h.

Within 30 s of removing the toy from conditioning, apply a force of $(5^{+0,5}_0) \text{ N}$ to the external surface of the toy through a steel needle with a diameter of $1 \text{ mm} \pm 0,1 \text{ mm}$ and with a tip radius of $0,5 \text{ mm} \pm 0,05 \text{ mm}$.

Apply the force gradually within a period of 5 s. Maintain the force for 5 s.

After completion, determine leakage by applying cobalt chloride paper over the area where the force was applied whilst elsewhere compressing with a force of $(5^{+0,5}_0) \text{ N}$ using suitable means other than a needle.

Repeat the test after conditioning the toy at a temperature of $(5 \pm 1) ^\circ\text{C}$ for a minimum of 4 h.

After completion, examine the toy for leakage of the contents.

If liquid other than water is used, confirm leakage using another suitable method.

NOTE Cobalt chloride paper should not be used for the $5 ^\circ\text{C}$ test, as condensation may give false results.

5.20 Durability of mouth-actuated toys (see 4.25)

Connect a piston pump capable of discharging and receiving more than 300 cm^3 of air in less than 3 s to the mouthpiece of the toy. Arrange a relief valve so that the pump will not generate a positive or negative pressure of more than 13,8 kPa. Subject the toy to ten alternating blowing and sucking cycles, each within 5 s and of at least $295 \text{ cm}^3 \pm 10 \text{ cm}^3$ of air including the volume which may be discharged through the relief valve. If the air outlet is accessible, ensure that the above is also applied to the outlet.

Determine whether any released component fits entirely in the cylinder when tested in accordance with 5.2 (small parts test).

5.21 Expanding materials (see 4.3.2)

Condition the toy or component at $(21 \pm 5) ^\circ\text{C}$ and at a relative humidity of $65 \% \pm 5 \%$ for 7 h prior to the test. Measure the maximum dimensions of the toy or any removable components in the x , y and z directions using callipers.

Submerge the toy completely in a container of demineralized water at $(21 \pm 5) ^\circ\text{C}$ for $2 \text{ h} \pm 0,5 \text{ h}$. Ensure that excess water is used, so that there is surplus water at the end of the test.

Remove the item using a pair of tongs. If the item cannot be removed because of insufficient mechanical strength, it is considered to comply with the requirement of 4.3.2.

Allow excess water to drain for 1 min and remeasure the item.

Calculate the expansion in the x , y and z dimensions as a percentage of the original measurement.

Determine whether the item complies with the requirements of 4.3.2.

5.22 Folding or sliding mechanisms

5.22.1 Loads

Load the toy with a mass of $50 \text{ kg} \pm 0,5 \text{ kg}$.

For toys intended for children up to and including 36 months, load the toy with a mass of $25 \text{ kg} \pm 0,2 \text{ kg}$.

5.22.2 Toy pushchairs and perambulators (see 4.12.1)

Precondition the toy by erecting and folding it 10 times.

a) Toy pushchairs and perambulators covered by 4.12.1 a)

Erect the toy on a horizontal surface with the locking devices engaged and load the toy with the appropriate mass specified in 5.22.1, ensuring that the load is borne by the frame. Where necessary, use a suitable support to ensure that the seat material is not damaged. Apply the load to the frame in the least favourable position with respect to the folding parts. Apply the load evenly over 5 s and maintain for 5 min.

Determine whether it is possible to partially erect the toy without engaging one of the locking devices. If so, also carry out the above loading in the partially erect position.

If the seat of the body is detachable from the chassis, this test shall also be carried out on the chassis only, using suitable support for the test mass.

Determine whether the toy collapses and whether the locking devices are still operable and engaged.

b) Toy pushchairs and perambulators covered by 4.12.1 b)

Erect the toy on a horizontal surface with the locking devices engaged and load the toy with the appropriate mass specified in 5.22.1 ensuring that the load is borne by the frame. Where necessary, use a suitable support to ensure that the seat material is not damaged. Apply the load to the frame in the most onerous position with respect to the folding parts. Apply the load evenly over 5 s and maintain for 5 min.

Determine whether it is possible to partially erect the toy without engaging the locking devices. If so, also carry out the above loading in the partially erect position.

Determine whether the toy collapses and whether the locking devices or safety stop are still operable and engaged.

5.22.3 Other toys with folding mechanisms (see 4.12.2)

a) Erect the toy. Lift the toy and observe whether the locking device disengages when the toy is tilted in any $30^\circ \pm 1^\circ$ angle from the horizontal.

- b) Erect the toy and position it on a surface inclined $\left(10^{+0.5}_0\right)^{\circ}$ in the most onerous position with respect to the folding parts. Engage any locking device. Load the toy for 5 min with the appropriate mass specified in 5.22.1. Apply the load wherever it is possible for a child to sit and in the least favourable position with respect to the folding parts. Ensure that the load is borne by the frame. Where necessary, use a suitable support to ensure that the seat material is not damaged.

Determine whether the toy collapses or the locking device disengages.

5.23 Washable toys (see 4.1)

Determine the mass of each toy prior to the beginning of the test.

Subject the toy to six machine-washing and tumble-drying cycles, unless a different method is specified by the toy manufacturer by means of a permanent label.

Any commercially available washer, dryer or laundry detergent intended for use in the home may be used for this test.

NOTE 1 Consideration should be given to the specific types of washing machines (top- or front-loading) used in the country in which the toy is meant to be sold.

Wash the toys plus a dummy load of clothes sufficient to bring the total dry mass to a minimum 1,8 kg in an automatic washing machine, using the “warm” water setting and approximately 12 min wash cycle at the “normal” setting.

Dry the toys and dummy load in accordance with the manufacturer’s instructions.

NOTE 2 For equivalent settings on other types of machines, “warm” is approximately 40 °C and a “normal” load is for an average size load according to the machine being used.

The toy shall be deemed to be dry when the final mass does not exceed the original dry mass by more than 10 %.

Determine whether the toy still conforms to the relevant requirements of clause 4.

5.24 Reasonably foreseeable abuse tests (see 4.2)

5.24.1 General

The tests in 5.24 are meant to simulate situations in which possible damage can occur to a toy as a result of reasonably foreseeable abuse.

Unless otherwise stated, these tests are only applicable for toys intended for children up to and including 96 months.

After undergoing each of the appropriate tests, the toy shall still continue to conform to the relevant requirements of clause 4.

5.24.2 Drop test

Except for toys covered in 5.24.3 (tip-over test for large and bulky toys), toys falling below the mass limits indicated in Table 4 shall be dropped onto a specified impact surface. The number of times the toy shall be dropped and the height from which it is dropped shall also be determined from Table 4. The toy shall be dropped in random orientation.

The impact surface shall consist of vinyl composition tile of approximately 3 mm nominal thickness laid over concrete of at least 64 mm thickness. The tile shall have a Shore 'A' hardness of 80 ± 10 and the impact surface shall be at least $0,3 \text{ m}^2$.

For battery-operated toys, the recommended batteries shall be in place during the drop test. If no specific type of battery is recommended, the heaviest battery which is generally available shall be used.

Table 4 — Drop test

Age group	Mass criterion kg	Number of drops	Drop height cm
Up to and including 18 months	$< 1,4$	10	138 ± 5
19 months up to and including 96 months	$< 4,5$	4	93 ± 5

After each drop, the toy shall be allowed to come to rest and shall be examined and evaluated before continuing.

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.3 Tip-over test for large and bulky toys

Large and bulky toys shall not be tested according to 5.24.2 (drop test) but in accordance with the following procedure:

Tip the toy over three times, one of which shall be in the most onerous position, by pushing the toy slowly past its centre of balance onto the impact surface described in 5.24.2 (drop test).

After each tip-over, the toy shall be allowed to come to rest and shall be examined and evaluated before continuing.

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.4 Dynamic strength test for wheeled ride-on toys

Load the toy for 5 min in the most onerous position with the appropriate mass in accordance with Table 2 on its standing or sitting surface.

Secure the load to the toy in a position corresponding to the normal use of the toy.

Drive the toy three times at a speed of $2 \text{ m/s} \pm 0,2 \text{ m/s}$ into a non-resilient step with a height of 50 mm.

If the toy is intended to bear the mass of more than one child at a time, test each sitting or standing area simultaneously.

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.5 Torque test

Any toy with a projection, part or assembly that a child can grasp with at least the thumb and forefinger or the teeth shall be subjected to this test.

Position the toy rigidly in any reasonable test position. Apply a clamp capable of holding the test component firmly and transmitting a torsion force to the test object or component.

Using a torque gauge or torque wrench, apply a torque of $0,45 \text{ N}\cdot\text{m} \pm 0,02 \text{ N}\cdot\text{m}$ in a clockwise direction until either

- a) a rotation of 180° from the original position has been attained, or
- b) the required torque is reached.

Apply the maximum rotation or required torque evenly over a 5 s period and maintain for an additional 10 s. The torque shall then be removed and the test component permitted to return to a relaxed condition.

Repeat the procedure in an anticlockwise direction.

Projections, parts, or assemblies that are rigidly mounted on an accessible rod or shaft designed to rotate along with the projections, parts, or assemblies, shall be tested with the rod or shaft clamped to prevent rotation.

If a component which is attached by a screw thread which has been assembled by the manufacturer, or which has been assembled according to the manufacturer's instructions, becomes loosened during the application of the required torque, continue to apply the torque until either the required torque is exceeded or the part disassembles. If it becomes obvious that the part under test will continue to rotate at less than the required torque limit and will not disassemble, terminate the test.

If the part disassembles and exposes an accessible component which can be grasped as noted above, repeat the torque test on the component.

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.6 Tension test

5.24.6.1 General procedure

Any toy with a projection, part or assembly that a child can grasp with at least the thumb and forefinger or the teeth shall be subjected to this test. The tension test shall be performed on the same components of the toy subjected to the test in 5.24.5 (torque test).

Apply a clamp capable of applying the tension load to the test component in a manner that will not affect the structural integrity of the attachment between the component and the toy. The loading device shall be a self-indicating gauge or other appropriate means having an accuracy of $\pm 2 \text{ N}$. With the test sample fastened in a convenient position, attach an appropriate clamp to the test object or component.

Apply a force of $70 \text{ N} \pm 2 \text{ N}$ parallel to the major axis of the test component evenly over a 5 s period and maintain for 10 s.

Remove the tension clamp and attach a second clamp suitable for applying a tension load perpendicularly to the major axis of the test component.

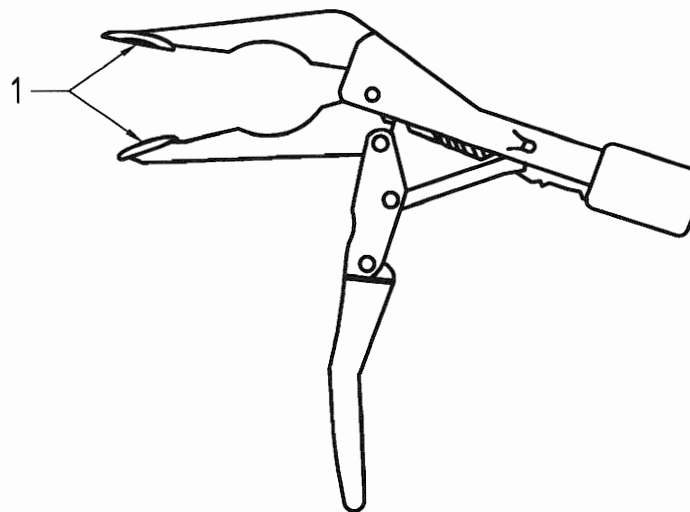
Apply a force of $70 \text{ N} \pm 2 \text{ N}$ perpendicularly to the major axis of the test component evenly over a 5 s period and maintain for 10 s.

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.6.2 Tension test for seams in soft-filled (stuffed) toys and beanbag-type toys

For soft-filled (stuffed) toys or beanbags constructed of pliable material having seams (including, but not limited to seams which are stitched, glued, heat-sealed or ultrasonically welded), the seams shall be subjected to a separate tension test.

The clamps used to grip the material on either side of the seam to be tested shall have jaws with attached discs of diameter 19 mm (see Figure 20).



Key

1 Flat discs

Figure 20 — Seam clamp

Attach the clamps to the cover material of a completely assembled stuffed toy in such a manner that the outside diameter of the 19 mm discs at a point nearest the seams will be close to, but no closer than, 13 mm from the edge of the seam stitching thread.

Apply a force of $70\text{ N} \pm 2\text{ N}$ evenly over a 5 s period and maintain for 10 s.

If the material adjacent to the seam cannot be grasped between the thumb and the forefinger of the test personnel sufficient for full clamping by the 19 mm diameter washer discs, the seam test shall not be performed. If this is the case, instead of the seam test, an arm, leg or other appendage of the toy shall be tested according to 5.24.5 (torque test) and 5.24.6.1 (general tension test).

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.6.3 Tension test for pompoms (see 4.5.3)

Pompoms shall be tested according to 5.24.5 (torque test) and the tension test as described here.

The clamps used to grip the material to be tested shall have jaws with attached 19 mm diameter discs (see Figure 20). Attach one clamp to the pompom and use a second clamp to grip the base material.

Apply a force of $70\text{ N} \pm 2\text{ N}$ evenly over a 5 s period and maintain for 10 s.

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.6.4 Tension test for protective components (see 4.8, 4.9 and 4.18)

Subject the part to be tested to a tensile force of $70\text{ N} \pm 2\text{ N}$ evenly over a 5 s period and maintain for 10 s.

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.7 Compression test

Any area on the surface of a toy that is accessible to a child and non-accessible to flat surface contact when tested according to 5.24.2 (drop test) shall be subjected to this test.

Determine the compression force from Table 5 according to the age group for which the toy is intended.

Table 5 — Compression force

Age category	Compression force
	N
Up to and including 36 months	$114 \pm 2,0$
37 months up to and including 96 months	$136 \pm 2,0$

The loading device shall be a rigid metal disc with a diameter of $30 \text{ mm} \pm 1,5 \text{ mm}$ and a thickness of 10 mm minimum. The perimeter of the disc shall be rounded to a radius of 0,8 mm to eliminate irregular edges.

Attach the disc to an appropriate compression scale having an accuracy of $\pm 2 \text{ N}$.

Place the toy on a flat hard surface in any convenient position. Position the disc so that the flat contact surface is parallel to the surface under test.

Apply the required force through the disc evenly over a 5 s period and maintain for 10 s.

Determine whether the toy continues to conform to the relevant requirements of clause 4.

5.24.8 Flexure test (see 4.9)

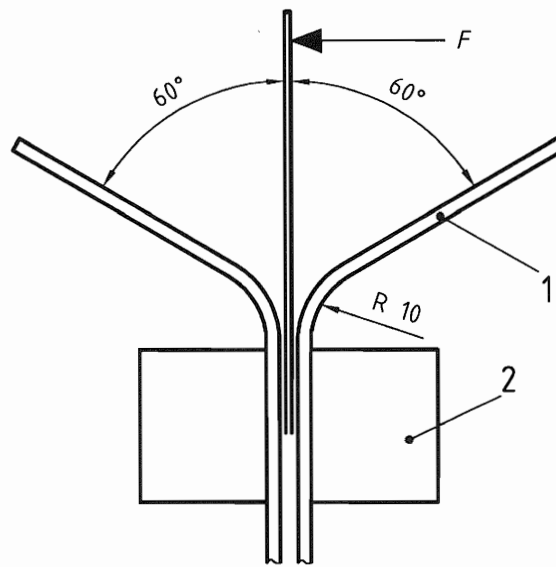
This test applies to metal wires or rods used as flexible skeletons for toys.

Secure the toy in a vise equipped with vise shields manufactured from $1,7 \text{ mm} \pm 0,1 \text{ mm}$ thick cold-rolled steel or other similar material and with a $10 \text{ mm} \pm 0,5 \text{ mm}$ inside radius as shown in Figure 21.

Bend the component through a 60° arc by a force F of $70 \text{ N} \pm 2 \text{ N}$ applied perpendicularly to the major axis of the component at a point 50 mm from the intersection of the component with the main body of the toy. If the component is less than 50 mm long, apply the force at the end of the wire.

Then bend the component in the reverse direction through a 120° arc. Repeat this process for 30 cycles at a rate of one cycle per 2 s with a 60 s rest period after each 10 cycles. Two 120° arc bends constitute one cycle.

Determine whether the toy continues to conform to the relevant requirements of clause 4.9.

**Key**

- 1 Vise shield fabricated from 1,7 mm cold rolled steel
- 2 Vise

Figure 21 — Flexure tester

Annex A

(normative)

Battery-operated toys

A.1 General

The requirements given in A.2 are specific to battery-operated toys (see 3.5) and are meant to address risks of injury associated with battery overheating, leakage, explosion and fire, and choking on or swallowing batteries. Battery-operated toys are also required to meet all mechanical and physical requirements of this part of ISO 8124.

A.2 Specific requirements

A.2.1 The battery compartment or the area immediately adjacent shall be permanently marked to show the correct battery polarity and voltage. If it is impractical to mark this information on the toy, the marking may be placed in the instructions.

A.2.2 It shall not be possible to charge rechargeable batteries when they are in the toy. However, charging is allowed under the following conditions:

- a) if for toys having a mass less than 5 kg, it is not possible
 - to remove the battery without breaking the toy, and
 - to charge other batteries from the toy;
- b) if for toys having a mass of 5 kg or more
 - the battery is fixed in the toy, and
 - connecting means are provided which ensure correct polarity when charging, and it is not possible to operate the toy during charging.

A.2.3 For toys intended for children under 36 months no batteries shall be accessible without the use of a tool or unless at least two independent movements have been applied simultaneously to the battery compartment.

The batteries shall not be accessible when tested according to 5.7 (accessibility of a part or component).

Testing shall be performed with recommended batteries installed.

A.2.4 For all toys, batteries that are small parts when tested according to 5.2 (small parts test) shall not be accessible without the aid of a tool or unless at least two independent movements have been applied simultaneously to the battery compartment.

The batteries shall not be accessible when tested according to 5.7 (accessibility of a part or component).

Testing shall be performed with recommended batteries installed.

A.2.5 Battery-operated toys shall not be powered by electricity of a nominal voltage exceeding 24 V, and no accessible part of the toy may exceed 24 V a.c. or d.c.

A.2.6 Batteries of different type or capacity shall not be mixed within any single electrical circuit. In applications requiring more than one type of capacity of battery to provide different functions, or in applications requiring the

combination of alternating current and primary batteries, each circuit shall be isolated electrically to prevent current from flowing between the individual circuits.

A.2.7 During normal use and reasonably foreseeable abuse, including stalled motors conditions, and short circuiting of accessible conductors and after detachable parts have been removed, battery-operated toys shall conform to a), b) and c) below. The test is terminated after 30 s if the toy has to be kept switched on by hand or foot. However, a short circuit is only applied if it is possible to bridge any insulation by a straight steel wire having a diameter of 0,5 mm and a minimum length of 25 mm.

a) The rise in temperature of handles, knobs and similar parts which are likely to be touched by hand during play shall not exceed the following values:

- parts made of metal 25 K
- parts made of glass or porcelain 30 K
- parts made of plastics or wood 35 K

b) The rise in temperature of other accessible parts of the toy shall not exceed the following values:

- parts made of metal 45 K
- parts made of other materials 55 K

The tests shall be carried out in a draught-free location at a temperature of $(21 \pm 5) ^\circ\text{C}$.

c) Additional requirements:

- sealing compound shall not flow out;
- the toy shall not emit flames or molten metal;
- poisonous or ignitable gas in hazardous amounts or any other dangerous substances shall not be produced;
- vapour shall not accumulate in the toy;
- enclosures shall not deform to such an extent that compliance with relevant requirements of the standard is impaired;
- batteries shall not leak hazardous substances or erupt;
- materials shall not char.

A.2.8 Insulation between parts of different polarity shall have adequate mechanical strength to prevent breakdown during use and reasonably foreseeable abuse if a short circuit of the parts in question will cause non-compliance with A.2.7 above.

A.2.9 The electrical circuitry shall not make electrical contact with any part of the battery except at the terminal contact surfaces.

A.2.10 Battery-operated toys shall contain instructions on safe battery usage, when applicable. These instructions shall contain wording to advise the consumer of the following:

- how to remove and insert batteries;
- that non-rechargeable batteries are not to be recharged;
- that adult supervision is required when charging rechargeable batteries;
- to not mix old and new or different types of batteries;
- to remove exhausted batteries from the toy;
- that supply terminals are not to be short circuited.

Annex B (informative)

Age-grading guidelines

B.1 Introduction

Good age-grading practices are important to ensure that a toy is appropriate and safe at the various stages of physical and mental development of the child using the toy.

Age labelling is meant to provide point-of-purchase guidance to consumers for the selection of appropriate toys for children with respect to average abilities, interests of various age groups and safety aspects of the toys themselves.

These guidelines are meant to provide thoughts and considerations necessary to establish meaningful age recommendations for toy products.

Further information can be found in [12].

B.2 Criteria for establishing age grades

The following criteria should be considered when establishing age grading for a toy. While all these should be considered in total, each one may be weighted individually to arrive at the appropriate age grading.

- a) The toy should match the physical ability of a child to manipulate and play with the specific features of a toy.

This necessitates an understanding of the physical coordination, fine and gross motor capabilities, size and strength generally available at a given age.

- b) The toy should match the mental ability of a child to understand how to use the toy (i.e. to understand instructions, sequences of operations, objective of the toy).

Consideration of the mental skills at a given age is important in order to provide a concept that will challenge abilities and stimulate further development, yet not frustrate. Accomplishment should be neither too easy nor too difficult to be satisfying to the child.

- c) The toy should meet play needs and interests at different levels of development.

Understanding developmental levels and identifying play materials and play environments to enhance each development stage is important for assigning appropriate age grades. Play interests and toy preferences change rapidly; there should be careful attention to children's preference or aversion to specific toy subjects at certain stages. In order for a toy to enhance play, it obviously must be appealing to its user. In short, it must be fun.

B.3 Resources for establishing age grades

Use of the following can help guide the establishment of meaningful age grading for a toy. These resources are not arranged in a particular order of importance; all of them should be considered during the age-grading process:

- prior experience with the toy or a similar toy in the marketplace indicating suitability for a specific age group;

- reference materials on comparative body measurements and human factor elements;
- reference resources on child development norms to establish developmental milestones;
- identification of developmental features to be enhanced/stimulated within certain age spans;
- expertise of outside consultants, child development specialists, physicians and psychologists;
- testing of models or prototypes with children;
- observing skills levels in children at play;
- seeking opinions of parents;
- interacting with children and asking questions.

B.4 Safety considerations of age grading

B.4.1 General

The toy should be safe for the intended user. Once the skill level has been determined, the design should be tailored to satisfy the requirements of this specification associated with the age level, that is, a toy within the skill and interest level of a child of two years and containing small parts cannot be age-graded at 3 years to avoid enlarging those parts.

Age grades are indicators of average development, which does not necessarily reflect suitability for the exceptional child. A parent remains the best judge of whether the child is at the appropriate development stage for safe play with a particular toy.

B.4.2 Toys appropriate for children under three years of age

A primary consideration should be potential choking and aspiration hazards associated with small parts. Children under the age of three are more prone to placing objects in their mouths. However, the propensity to put non-food objects in the mouth does not disappear at the chronological age of three years. The following toys are appropriate for children under three years of age:

Squeeze toys, teethingers, crib exercisers, crib gyms, crib mobiles, toys intended to be affixed to a crib, stroller, playpen or baby carriage, pull and push toys, pounding toys, blocks and stacking sets, bathtub, wading pools and sand toys, rocking, spring, and stick horses and other figures, chime and musical balls and carousels, jack-in-the-boxes, stuffed, plush and flocked animals and other figures, and those preschool toys, games and puzzles, riding toys, dolls and animal figures, cars, trucks and other vehicles that are intended for use by children under the age of three years.

Some of the characteristics that describe those preschool toys appropriate for children under the age of three years are listed below by class of toy:

- dolls;

Soft-bodied baby dolls or character dolls that are for holding or cuddling, stuffed or "beanbag" dolls, rag or cloth dolls with simple features (including accessories), and lightweight plastic dolls with small features and limited articulation at the limb joints;

- infant toys;

Toys intended to be used in a crib or playpen, to be held easily by small hands, shaken, grasped, rattled or cuddled.

- toy vehicles;

Cars, trucks, boats and trains of simple chunky shape, decorated in primary colours without extensive descriptive detail or representations of a particular make or model of vehicle, and that require simple actions such as rolling, dumping, pushing and releasing.

- action toys;

Simple action toys for the identification of sounds or pictures and surprise-action toys.

- early-learning toys;

Such toys, books and puzzles for learning basics such as letters or numbers or shapes, and simple physical motions such as turning wheels or knobs, pulling and letting go or sorting by size, etc.

- soft balls and similar items.

Soft lightweight balls or other shapes for squeezing, shaking, rolling or tossing.

B.4.3 Toys not appropriate for children under three years of age

Toys that should not be considered appropriate for children under three years of age and therefore not be age-labelled as such, have the following characteristics:

- toys that require intricate finger movements or controlled adjustments, fitting intricate pieces together;
- toys, e.g. games, that require or incorporate elements of reading elements of reading ability beyond the ABCs or 123s;
- toys that simulate adult figures or characters and their associated accessories;
- collecting sets (for example, figures and vehicles);
- projectile-type toys, launched vehicles, planes, etc.;
- make-up sets;
- toys incorporating long cords or straps.

B.4.4 Toys for children aged eight years and over

Another major development cut-off has been cited at approximately eight years of age, at which time reading ability has progressed so that a child can, on this own, read, understand and heed instructions, caution statements, etc. Because the instructions and caution statements are necessary for the safe use of the product in some cases, those products should be labelled for use by children over the age of eight.

Products that fall into this category include the following:

- science and environmental kits or sets containing breakable glass components and complex instructions;
- complex model and craft sets requiring precision assembly and finger dexterity or incorporating sharp tools or components;
- electrically operated toys incorporating heating elements;

- certain chemistry sets, fuelled model vehicles, and rockets, etc. that contain chemicals that may be hazardous, cannot generally be handled safely by children unable to read and understand instructions and cautionary statements. The minimum age for which any such product should be recommended is eight years and then only with adult supervision.

B.5 Descriptive age-labelling

Manufacturers can assist parents and other purchasers in the appropriate selection of toys by incorporating descriptive labelling to identify potential safety concerns if the toy is accessible to children outside the recommended age group.

Factors to consider include the appeal of the toy to young children, market experience, the design or construction of the toy, and whether the packaging provides visual indication of any small play pieces. In addition, a manufacturer should consider the probability that a purchaser may overestimate a child's physical or mental abilities and the child's understanding of a potential hazard related to the toy.

Annex C **(informative)**

Safety-labelling guidelines and manufacturer's markings

C.1 Introduction

This annex provides guidance for labelling of certain types of toys.

The purpose of safety labelling is to supply appropriate safety information to the consumer at the point of purchase (i.e. on the toy, or on the packaging if there is one) and/or prior to the initial use of the toy (i.e. in the instructions) and/or prior to each use of the toy (i.e. labelling on the toy).

Requirements for toy safety labelling for certain toys or toy characteristics are given in the appropriate subclauses of clause 4.

It should be noted that these guidelines do not assure full compliance with relevant national toy safety requirements in the market where the product is meant to be distributed. The user of these guidelines is therefore advised to study relevant national requirements.

C.2 Safety-labelling guidelines

C.2.1 Label definition and location

The safety labelling should be in a visible, easily legible, understandable and indelible form.

The safety information should be in a format that draws the attention of the consumer, and should be placed on the packaging or the product so the consumer, at the point of purchase, can easily see it.

C.2.2 Age grading

Toys subject to any of the requirements of this part of ISO 8124 should be labelled to indicate the minimum age for intended use. If the toy or the packaging is not age-labelled in a clear and conspicuous manner or is inappropriately age-labelled, the toy should be subjected to the most stringent applicable requirements within this part of ISO 8124.

For certain toys such as costumes and riding toys, it may also be appropriate, from a safety point of view, to label the toy, its packaging or both in terms of size or weight limitations.

Guidelines for determining the appropriate age grade for toys are given in annex B.

C.2.3 Small toys and toys containing small parts (see 4.4)

The toy or its packaging should carry a statement similar to the following:

“Warning! Not suitable for children under 3 years. Contains small parts.”

The words “Warning! Not suitable for children under 3 years” may be substituted by a graphical symbol as given in Figure C.1.

The indication of the specific hazard(s) should appear on the toy itself, on the packaging or in the instructions for use.



Figure C.1 — Graphical symbol for age warning

The details of the design of the graphical symbol should be as follows:

- the circle and the stroke should be red;
- the background should be white;
- the age range and the outline of the face should be black;
- the symbol should have a diameter of at least 10 mm and the proportions between its different elements should be such as those prescribed in Figure C.1;
- the age range for which the toy is not suitable should be expressed in years, e.g. 0-3.

C.2.4 Balloons (see 4.5.6)

The packaging should carry a statement similar to the following:

“Warning! Children under 8 years can choke or suffocate on uninflated or broken balloons. Adult supervision required. Keep uninflated balloons from children. Discard broken balloons at once.”

C.2.5 Small balls (see 4.5.2) **and marbles** (see 4.5.7)

- a) If the toy is a small ball or the toy contains a small ball, the toy or its packaging should carry a statement similar to the following:

“This toy is a small ball which may present a choking hazard. Not for children under 3 years.”

or

“This product contains a small ball which may present a choking hazard. Not for children under 3 years.”

- b) If the toy is a marble or the toy contains a marble, the toy or its packaging should carry a statement similar to the following:

“This toy is a marble which may present a choking hazard. Not for children under 3 years.”

or

“This product contains a marble which may present a choking hazard. Not for children under 3 years.”

C.2.6 Aquatic toys (see 4.19)

Aquatic toys should carry a statement that this is not a life-saving device, followed by a warning that the toy should only be used in shallow water and under supervision.

C.2.7 Crib, playpen toys and mobiles (see 4.11.5)

The toy and its packaging should carry a statement drawing attention to the possible entanglement or strangulation injury if the toy is not removed when the baby begins to push up on hands and knees (see also C.3.2 and C.3.3).

C.2.8 Toys in contact with food

The packaging, instructions, or both, for toys and their components intended to be used in contact with food, should carry a statement to alert adults to wash the product thoroughly before and after use.

C.2.9 Toys intended to be assembled by an adult

The packaging of toys that are intended to be assembled by an adult should be so labelled (see also C.3.6).

C.2.10 Crib gyms and similar toys (see 4.11.6)

Crib gyms and similar toys intended exclusively to be strung across a crib, playpen or perambulator by string, cord, elastic or straps, as well as their packaging, should carry a statement drawing attention to the possible entanglement or strangulation injury if attached to crib, playpen or perambulator and not removed when the baby begins to push up on hands and knees (see also C.3.2 and C.3.3).

C.2.11 Simulated protective equipment (see 4.17)

Toys that simulate safety protective equipment (examples include, but are not limited to, construction helmets, sports helmets and fire-fighter helmets), as well as their packaging, should carry a statement informing the consumer that they are toys and do not offer protection.

C.2.12 Toys with functional sharp edges and functional sharp points (see 4.6.2 and 4.7.2)

Toys that are intended for use by children from 37 up to and including 96 months, which contain accessible sharp edges or accessible sharp points that are a necessary part of the function of the toy, should carry a statement on the packaging that a sharp edge or sharp point, or both, exists.

C.2.13 Functional toys

Functional toys should carry a label stating that the product should only be used under direct adult supervision.

C.2.14 Toy roller skates and toy skateboards (see 4.26)

Toy roller skates and toy skateboards are products that are intended for children with a mass of 20 kg maximum. Toy roller skates and toy skateboards should carry a label recommending the user to use protective equipment such as helmet, wrist-pads, knee-pads and elbow-pads and to not use the product on the road.

C.2.15 Projectile toys (see 4.18.1 and 4.18.2)

Toys with projectiles should be accompanied by instructions for use which draw attention to the hazard of aiming at eyes or face and of using projectiles other than those supplied or recommended by the manufacturer.

C.2.16 Toy kites (see 4.11.7)

Toy kites or other flying toys with cords should carry a warning not to be used near overhead power lines or during thunderstorms.

C.2.17 Toy bicycles (see 4.21.1)

Toy bicycles should carry a label recommending the use of a protective helmet when cycling.

In addition, the instructions for use should contain a reminder that this bicycle is not permitted for use on public highways. Moreover, parents or carers should ensure that children are properly instructed in the use of toy bicycles, particularly in the safe use of the braking systems.

C.2.18 Percussion caps (see 4.27)

The packaging of percussion caps should carry a warning to not be used indoors or near eyes and ears and to not be carried loose in a pocket.

C.3 Instructional literature

C.3.1 Information and instructions

Information and instructions that are provided for the safe use or assembly, or both, of a toy, whether on the packaging or in leaflet form, should be easy to read.

C.3.2 Crib, playpen toys and mobiles (see 4.11.5)

Mobiles intended to be mounted on a crib, playpen, wall or ceiling should be provided with instructions for proper assembly, installation and use to ensure that the product does not present an entanglement hazard. The instructions should include at least the following information:

- a crib mobile is not intended to be grasped by the child;
- if attached to the crib or playpen, remove when the baby begins to push up on hands and knees;
- if mounted on a wall or ceiling, install the mobile clearly out of a standing baby's reach;
- always attach all provided fasteners (strings, straps, clamps, etc.) tightly to a crib or playpen according to the instructions. Check frequently;
- do not add additional strings or straps to attach to a crib or playpen.

C.3.3 Crib gyms and similar toys (see 4.11.6)

Toys intended to be strung across a crib or playpen by means of string, cords, elastic, or straps (including, but not limited to, crib exercisers, crib gyms, and activity toys) should be provided with instructions for proper assembly, installation, and use to ensure that the product does not present an entanglement or strangulation hazard.

The instructions should include at least the following information:

- this toy is not intended to be "mouthed" by the baby and should be positioned clearly out of reach of the baby's face and mouth;
- on cribs with adjustable mattress levels, the highest position can cause the toy to be too close to the baby;

- the drop side of the crib should never be lowered with the toy in place and the baby left unattended;
- always attach all provided fasteners (strings, straps, clamps, etc.) tightly to a crib or playpen according to the instructions. Check frequently;
- do not add additional strings or straps to attach to a crib or playpen.

C.3.4 Toy chests [see 4.16.2.2 d)]

Instructions for proper assembly and maintenance should be provided in sufficient detail to describe the correct assembly of components, the resulting hazard if the lid support device is not installed, and a description of how to determine whether the support is working properly.

C.3.5 Liquid-filled teethers and liquid-filled teething toys (see 4.24)

Liquid-filled teethers and teething toys should be accompanied by instructions that they should not be placed in the freezer compartment.

C.3.6 Toys intended to be assembled by an adult

Assembly instructions that accompany toys that are intended to be assembled by an adult and that contain potentially hazardous sharp edges or sharp points, or contain small parts if the toy is intended for children under 3 years of age, should carry a statement stating this and also that it is to be assembled by an adult (see also C.2.9).

C.4 Manufacturer's markings

A principal component of the toy, the packaging, a label or a leaflet accompanying the toy should be marked with the name and address of the manufacturer or the distributor, or with a trademark and/or mark which clearly identifies the manufacturer/distributor. All these markings should be visible and easily legible by the consumer and should resist normal use conditions.

Annex D

(informative)

Design guidelines for toys attached to cribs or playpens

D.1 Introduction

This annex provides guidance for design practices meant to encourage the careful examination of product characteristics and configurations with respect to safety. As there are no objective means for determining conformance with these design guidelines, they are not to be used to judge compliance with this part of ISO 8124.

D.2 Guidelines

The design of products intended to be attached to cribs or playpens should be such that strings, ribbons, elastic or parts of clothing have minimal potential for being caught on the product and thereby creating a hazardous situation in which possible strangulation could occur.

Examples of the implementation of good design practice for crib and playpen environments include the following:

- avoidance of hazardous protrusions that could contribute to entanglement on toys attached to cribs and playpens;
- rounded corners with the use of generous radii wherever possible;
- smooth contours that minimize abrupt changes in shape that could easily become a catch point for strings, ribbons, elastic or loose clothing;
- concealing of fastening hardware using recesses, counterbores or other similar methods;
- reduction of the potential for any mismatch of surfaces where a catch point could develop.

Annex E **(informative)**

Rationale

E.1 Scope (see clause 1)

In the scope of this part of ISO 8124 a number of products are listed which, for the purposes of this part of ISO 8124 are not considered as toys. However, some explanatory comments on the following items are considered to be necessary:

- a) This part of ISO 8124 covers toy bicycles with a maximum seat height of 435 mm. Bicycles for children with a seat height ranging from 435 mm to 635 mm are covered by ISO 8098;
- e) "Compressed-air and gas-operated guns and pistols" refers to weapons which use high-compressed air or other gases to eject metal or plastic bullets or small darts and which are often used by adults in competitions. In many countries there are legal restrictions on the sale of such guns to children. The exemption does not include toy guns which for example eject water by means of compressed air;
- i) "Models of aircraft, rockets, boats and land vehicles powered by combustion engines" also includes the engine itself as well as spare parts;
- w) "Fashion jewellery for children" does not include jewellery which is part of e.g. a doll and is not intended to be worn by a child. Nor does it include kits for making jewellery.

E.2 Normal use (see 4.1)

The objective of these tests is to simulate the normal play mode of the toy, and the tests are therefore unrelated to the reasonably foreseeable abuse tests required in 4.2. The tests are intended to expose potential hazards, rather than to demonstrate the reliability of a toy.

For the purposes of this part of ISO 8124, the fact that a toy fails normal-use testing is only relevant if the failure generates a potential hazard according to the appropriate test methods given in clause 5.

Toys should be subjected to appropriate tests to simulate the expected mode of use of the particular toy. For example, levers, wheels, catches, triggers, strings, wires, chains and so on that are intended to be actuated by a child should be repeatedly operated. Spring- or power-operated devices should be similarly tested.

The tests should be carried out in an expected-use environment. For example, toys intended for use in the bathtub should be tested in soapy water, and toys intended for use in the sandbox should be exposed to sand during testing.

It is recognized that no specific requirements are defined here; it would not be possible in view of the wide range of toys covered by this part of ISO 8124. However, the manufacturer or distributor should do enough testing to satisfy himself that normal use during the estimated lifetime of the toy is being simulated.

E.3 Reasonably foreseeable abuse (see 4.2)

The intention of the tests in 5.24 (reasonably foreseeable abuse tests) is to simulate the exposure of a toy to structural damage as a result of dropping, pulling, twisting and other actions likely to be performed by a child interacting with the toy. These simulated interactions are characterized as reasonably foreseeable abuse.

The severity of the tests in 5.24 should be determined according to the age group for which the toy is intended. If the toy is intended for an age range that spans more than one age group, the toy should be subjected to the most severe test.

After testing according to 5.24, the toy should continue to conform to the relevant requirements of this part of ISO 8124

E.4 Material quality (see 4.3.1)

The intention of this requirement is that materials used in toys are to be new or, if reprocessed, so refined that the level of contamination of hazardous substances does not exceed that found in new material. There should be no infestation from animals or vermin.

E.5 Expanding materials (see 4.3.2)

This requirement is intended to reduce the risks related to certain toys which expand dramatically if swallowed. Fatal accidents have occurred when children have swallowed such toys.

E.6 Small parts (see 4.4)

This requirement is intended to reduce the risks from ingestion or inhalation of small objects, such as small toys and small components of toys.

Toys made of foam from which small parts are torn off when tested according to 5.24 (reasonably foreseeable abuse tests) are considered hazardous. This also applies to soft-filled toys with filling composed of small foam parts which become accessible when tested according to 5.24.

Wood knots in wooden toys are by nature never the same, and no conclusion about the safety level for a certain kind of products can be drawn from a single toy with loose wood knots. Small wood knots in wooden toys which can easily be pulled or pushed out should, however, be considered as removable small components.

E.7 Shape, size and strength of certain toys (see 4.5)

The purpose of the requirements in 4.5 is to identify certain toys which may become choking and/or suffocation hazards because their design or construction permits them to enter an infant's mouth and become lodged in the throat. They are also meant to identify potential impact hazards associated with teething toys and squeeze toys intended for children up to and including 18 months.

In determining which toys are intended for children that are unable to sit up unaided and for children up to and including 18 months, the following factors are relevant: the manufacturer's stated intent (such as on a label) if it is reasonable, the advertising, the promotion, the marketing and whether the toys are generally considered as suitable for the age group in question.

It is recognized that children start to sit up unaided between five to ten months of age.

E.8 Pompoms (see 4.5.3)

These requirements are meant to address choking hazards associated with pompoms (see examples in Figure 3) on toys intended for children up to and including 36 months.

The definition of pompoms (3.36) includes regular pompoms as well as rounded tassels as described in Figure 3. In addition, although different in construction, spherical-shaped attachments made of stuffed material are very similar

to pompoms in feel and appearance and are used to adorn products in a similar way. These pose a hazard similar to that of pompoms and should therefore be subject to the same requirements.

Injury data do not support the need to include tassels with long strands as shown in Figure 4.

E.9 Preschool play figures (see 4.5.4)

This requirement is meant to address the potential choking and/or obstruction hazard associated with certain preschool figures intended for children up to and including 36 months.

E.10 Balloons (see 4.5.6)

Pieces of broken latex balloons present choking and suffocation hazards to children and a warning should be given.

E.11 Edges (see 4.6)

These requirements are intended to reduce the risks related to cuts and lacerations from sharp edges on toys.

This part of ISO 8124 refers to metal and glass edges only, as there is no test method available for plastic edges. Manufacturers should however, in designing toys and in the production and tooling, avoid sharp plastic edges as far as possible.

It has been considered that the test method for assessing sharp edges should be supplemented with a subjective assessment to determine whether they are, in fact, hazardous. There could be edges on toys that, although sharp according to the test method, do not present a hazard.

The presence of burr on an edge is established by drawing a finger along the edge. To fail the requirement, the roughness needs to be sufficient to fail the sharp-edge tester.

It has been established that it is not possible to manufacture electrical conductors (for example in battery boxes) which do not present sharp edges. This hazard has, however, been considered to be of a minor nature and allowance has therefore been given for such edges.

E.12 Points (see 4.7)

These requirements are intended to reduce the risks from sharp points on toys capable of causing punctures of the skin, etc. It should, however, be noted that they do not intend to cover risks related to the eyes, which are too delicate to be protected.

It has been considered that the test method for assessing sharp points should be supplemented with a subjective assessment to determine whether they are, in fact, hazardous. There could be points on toys that, although sharp according to the test method, do not present a hazard. An example of this are the points of pipe-cleaners, used as toys, that are so weak that they are not capable of puncturing the skin.

For children up to and including 36 months however, points that are not sharp according to the test method may present an unreasonable risk. In 4.7.1 c) requirements are given for points with a maximum cross-section of 2 mm.

E.13 Projections (see 4.8)

These requirements are intended to minimize possible puncture hazards to the skin should a child fall on unprotected tubes or rigid components, e.g. toy bicycle handle bars, levers on go-carts and pram frames. Such protruding parts should be protected. The size and shape of the protection has not been stipulated but it should be given a sufficiently large surface area.

Since the requirement is concerned with hazards arising from a child falling onto a toy, it follows that this requirement relates only to vertical or nearly vertical projections. The toy is tested in its most onerous position.

If the projection is on a small toy which topples over when pressure is applied to the end of the projection, it is unlikely to present a hazard.

E.14 Metal wires and rod (see 4.9)

Wires that are intended or likely to be bent, whether covered by other materials or not, are subjected to the flexibility test and should not break and produce sharp points. Wires are often used in soft-filled (stuffed) toys, which are considered suitable for children under 36 months. Should such a wire break, it will eventually protrude through the covering and constitute a hazard to the young child.

E.15 Plastic film or plastic bags in packaging and in toys (see 4.10)

This requirement is meant to minimize the possibility of asphyxiation hazards that might be caused by thin flexible plastic film if it is covering the face of the child or being inhaled.

Thin plastic sheeting may adhere to the child's mouth and nose, making it impossible to breathe. If the thickness is greater than 0,038 mm this risk is considered less dangerous.

Latex balloons are not covered by 4.10, as they are not made of plastic. Plastic balloons are normally so strong that they cannot be taken apart by a child and the thickness of the plastic sheeting should therefore be measured on double layers of sheeting (i.e. without cutting the balloon apart).

E.16 Cords and elastics (see 4.11)

The intention of these requirements is to prevent children from being strangled by cords on toys that can tangle to form a noose or a fixed loop around the neck. They also address the risk of the child being entangled by a self-retracting cord on, for example, a chiming toy.

A nonwoven (monofilament) cord cannot easily form a noose.

The requirement in 4.11.6 is intended to reduce the possible risk of strangulation that might be caused by toys on a cord fixed across, for example, a cot. If the child is trying to stand up in the cot, it might be entangled by the cord which could form a loop around the neck or the child could fall with his/her throat across it.

The purpose of the requirements in 4.11.7 is to prevent the user of a toy kite suffering electric shock from a toy kite which comes in contact with overhead power lines. They also highlight the danger of flying a toy kite in thunderstorms.

E.17 Toy pushchairs, perambulators and similar toys (see 4.12.1)

These requirements refer to certain, but not all, possible crushing, laceration and pinching hazards that might occur due to the sudden and unexpected collapse of folding toys, whether intended to support the mass of a child or not.

They are also intended to reduce the possible risk of the child being entrapped in a collapsing pushchair or perambulator, as well as children getting their fingers jammed when playing with a toy.

Fatal accidents are known to have occurred when toy pushchairs have collapsed and the handle has come down over the head or throat of the child when the child has been trying to sit in or climb into the toy pushchair. It has been considered necessary to require that such pushchairs or perambulators be equipped with two separate locking and/or safety devices, as is the case for full-size pushchairs and prams.

Certain pushchairs are not designed with a handlebar that folds down over the toy when it collapses, but folds together in a sideways direction. It has been considered that such toys do not present the same severe hazard and consequently do not require two separate locking devices.

However, it has not been considered possible to eliminate all possible jamming hazards on toys when they are folded together in their intended way. Manufacturers should reduce those risks as far as possible, for example by allowing for a 12 mm clearance between moving parts or by using safety stops. Great care should also be used when designing toys with folding or sliding parts, so that scissors-like actions of moving parts are avoided as far as possible.

E.18 Other toys with folding mechanisms (see 4.12.2)

The requirement that the toy be capable of supporting a child, or comparable mass, excludes smaller toys.

E.19 Hinge-line clearance (see 4.12.3)

This requirement is intended to eliminate the possible crushing hazard related to the changing clearances at the hinge line, admitting fingers in one position of the hinged part but not in another.

It is only applicable to hinged assemblies of which both parts have a mass of 250 g or more and where the moving part with respect to the hinge can be construed as a 'door' or a 'lid'. A door or lid can be defined for the purpose of this requirement as a closure of extended surface area with an extended hinge line. Other hinged parts without a significant surface area or hinge line would probably fall into the category of folding mechanisms (see 4.12.1) or other collapsible toys (see 4.12.2).

The requirement relates to the entrapment and injury through squashing of a finger between edges along the hinge line and between surfaces parallel with the hinge line as shown in Figure 2, but not between other edges and surfaces of the assembly. It is concerned only with the considerable force which can be applied to the edges of the hinge line when the door or lid is closed or opened.

It was not considered possible to specify a hinge area instead of a hinge line. Manufacturers should, however, consider this and try to reduce the risk of crushing the fingers or other parts of the body, for example, by allowing for a 12 mm clearance between moving parts near the hinge line.

E.20 Circular holes in rigid materials (see 4.13.1)

This requirement is meant to avoid finger entrapment in accessible holes in sheet metal and other rigid material in toys intended for children aged up to and including 60 months. Noncircular holes are believed to present no significant hazard or cutting off blood circulation in entrapped fingers.

E.21 Accessible clearances for movable segments (see 4.13.2)

This requirement concerns clearances between movable segments on toys intended for children up to and including 96 months, and only where the potential for crushing of fingers or other appendages exists. It includes, but is not limited to, wheels and rigid-wheel wells, fenders or the radial clearance between the wheels and chassis of ride-on toys powered by electrical, spring or inertial energy.

E.22 Chains or belts in ride-on toys (see 4.13.3)

Driving mechanisms should be enclosed in order to prevent jamming or crushing of fingers and other parts of the body. Toys that are to be assembled by an adult are tested when assembled.

E.23 Other driving mechanisms (see 4.13.4)

These requirements are intended to reduce the risks caused by sharp edges and points being exposed and to avoid pinching or laceration by entrapment of fingers in holes if the toy has been damaged.

Failure under this clause occurs where mechanisms become accessible and the accessibility of moving parts would be liable to jam the fingers or otherwise injure a child. Small mechanisms, such as in small cars which would have insufficient power to jam fingers, should be excluded. Power should be checked with a finger or pencil inserted into the mechanism.

E.24 Winding keys (see 4.13.5)

This requirement is meant to avoid pinching or laceration of fingers between the key and the body of the toy and entrapment of the fingers in holes in the flukes of the key.

E.25 Springs (see 4.14)

These requirements are intended to prevent the pinching or crushing of fingers, toes and other parts of the body by toys with springs.

E.26 Sideways stability requirement (see 4.15.1.1 and 4.15.1.2)

These requirements are meant to minimize unexpected hazards that could be caused by a toy that can easily tip. They recognize two types of possible stability hazards: those associated with ride-on toys or seats where the feet can provide stabilization, and those situations where the feet are restricted by an enclosing structure. It takes into account the use of the child's legs as stabilizing means, and recognizes that a child instinctively learns to compensate for inclined positions.

E.27 Fore and aft stability (see 4.15.1.3)

This requirement relates to the stability of ride-on toys or seats in the front and back direction with respect to the rider, where the rider cannot easily use his/her legs for stabilization. It intends to ensure the fore and aft stability of, for example, tri-cycles and rocking horses so that they do not overturn unexpectedly.

E.28 Overload requirements for ride-on toys and seats (see 4.15.2)

This requirement is meant to minimize unexpected hazards that could be caused by a toy that is not capable of withstanding an overload.

E.29 Stability of stationary floor toys (see 4.15.3)

This requirement intends to minimize hazards that might be caused by a toy, such as play furniture and toy chests, that tips when a door, drawer or other movable portion is extended to its fullest travel.

E.30 Enclosures (see 4.16)

The purpose of these requirements is to reduce the possible risk of entrapment of children in toys that form enclosures, such as tents and toys chests and to avoid possible suffocation in head-enclosing toys such as space helmets.

All toys forming a confined space into which a child can enter are covered by this requirement regardless of whether the toy is designed to hold a child or not. Even if ventilation is ensured, it has to be possible for the child to escape easily from the confinement without help from the outside.

E.31 Simulated protective equipment such as helmets, hats and goggles (see 4.17)

These requirements are meant to minimize hazards that might be caused, for example, by goggles or space helmets if the material from which they are constructed fails, or by toys that simulate protective equipment such as sports helmets and pads, if the wearer uses the article as real protective equipment rather than as a toy.

Items such as swimming goggles and diving masks, which do offer protection to the child, are not considered as toys and are not covered by this part of ISO 8124.

Sunglasses intended for children are not considered as toys, since they are required to offer protection against ultraviolet light. However, sunglasses for dolls, teddy-bears etc., that are too small for children to wear, are considered as toys.

E.32 Projectile toys (see 4.18)

These requirements relate to certain, but not all, potential unexpected hazards that might be caused by projectile firing toys and by the firing of improvised projectiles from such toys.

Certain well-recognized hazards that are inherent in traditional toys such as slingshots and darts are not covered by these requirements.

A toy in which the kinetic energy is determined by the toy, and not by the child, is typically a gun or other spring-loaded device. A pea-shooter is an example of a toy with a projectile (a pea) of which the kinetic energy is determined by the child by blowing.

Ground-based vehicular toys propelled along a track or other surface are not considered as projectile toys, even if they include an element of motion in free flight, for example between tracks.

The velocity of projectiles may be measured by direct or indirect means.

NOTE Alternative methods for determining the kinetic energy of projectiles are currently being investigated.

E.33 Aquatic toys (see 4.19)

These requirements are intended to reduce the risk of drowning due to the sudden loss of buoyancy of inflatable aquatic toys if air is released through the inlet. They also aim at informing adults and children of the dangers of using these toys in deep water. The standard covers inflatable toys intended to bear the mass of a child and used for play in shallow water and generally under the supervision of an adult.

Stoppers on valves should not become detached and they should be protected against being inadvertently removed. Nonreturn valves are often provided to facilitate the inflation of the toy.

Other products, such as large inflatable boats, which by virtue of their size and design are intended to be used in deep water, are not covered. Arm bands and similar flotation aids are exempted, as they are considered to be swimming aids and not toys.

Bathroom toys are generally used indoors in a bathtub and are not covered by this clause, nor are inflatable beach balls, which are primarily used on the beach and not in the water.

E.34 Braking (see 4.20)

The purpose of these requirements is to prevent accidents due to insufficient braking capabilities of toy vehicles. They specify that all ride-on toys with a free-wheeling facility shall be equipped with a brake. Excluded are toys with a direct transmission, e.g. tricycles with pedals on the front wheel, pedal cars and also electrically driven cars where the child's feet are free and can be used to brake the vehicle.

In assessing free-wheeling, it is often convenient and more practical to test the toy on a 10° slope and establish whether it accelerates down the slope. It should only be necessary in case of uncertainty to use the formula.

The complete formula for calculating the free-wheeling facility is

$$\begin{aligned} & (m + 25) \cdot g \cdot \sin 10^\circ \\ &= (m + 25) \cdot g \times 0,173 \\ &= (m + 25) \times 1,70 \end{aligned}$$

where m is the mass of the toy vehicle.

E.35 Toy bicycles (see 4.21)

This part of ISO 8124 covers bicycles with a maximum saddle height up to 435 mm. These small bicycles are not intended to — and should not — be used in the streets or on the highway.

Legal requirements may exist in certain countries regarding the equipment and/or use of bicycles for young children.

E.36 Speed limitation of electrically driven ride-on toys (see 4.22)

Please note that certain countries may have speed limitations for electrically driven ride-on toys in their national legislation.

E.37 Liquid-filled toys (see 4.24)

These requirements are intended to reduce the risks related to punctured teethingers and similar products, and where the child can come in contact with liquids that are contaminated or become contaminated due to a puncture.

When leakage occurs when tested in accordance with 5.19, the following may be taken into account in assessing the potential hazards of the liquid.

a) Aqueous liquids

- 1) ease with which the leakage occurred;
- 2) microbiological quality of the liquid (e.g. presence of known pathogenic organisms);
- 3) use of chemical preservatives (only those preservatives permitted for use in foodstuffs; note that quantitative limits may not apply in the case of small volumes of liquid);
- 4) other dissolved substances (e.g. colours etc.).

b) Non-aqueous liquids (other national legislation may apply in the case of some non-aqueous liquids)

- 1) ease with which the leakage occurred;
- 2) nature and identity of the liquid;
- 3) volume of the liquid;
- 4) toxicity of the liquid;
- 5) flammability of the liquid;
- 6) the effect of the liquid on other materials onto which it might leak.

Note that this requirement does not apply to electrolyte in batteries. Nor does it apply to paints, fingerpaints or similar items in containers.

The warning required in 4.24 is intended to make parents aware of the risk associated with giving the child a teether which is so cold that it could harm the child.

E.38 Mouth-actuated toys (see 4.25)

These requirements are intended to prevent mouth-actuated toys or their mouthpieces from being unintentionally inhaled and causing the user to asphyxiate.

It is essential that such toys, as well as removable or detachable mouthpieces of toys (e.g. the mouthpiece of a trumpet), are not so small that they can be unintentionally swallowed or inhaled.

To ascertain that small parts do not come loose when a mouth-actuated toy such as a harmonica or whistle is being used, such toys are subjected to a sucking and blowing test where a specified volume of air is forced through the toy.

This requirement applies regardless of the age of the child for whom the toy is intended.

E.39 Percussion caps specifically designed for use in toys (see 4.27)

These requirements are intended to reduce the risk of damage to the eyes from sparks, flames and glowing parts caused by toy percussion caps accidentally exploding outside the toy weapon, or by excessively dangerous explosive behaviour of properly used caps due to inadequate construction or manufacturing. They also apply to injuries caused by the simultaneous reactions of a larger number of caps.

Annex F **(informative)**

Acoustics

NOTE The requirements and test methods according to EN 71-1:1998 are given here for information. Following a report [13], the requirements and transition periods are currently being reviewed by CEN.

F.1 Terms and definitions related to this annex

F.1.1

close-to-the-ear toy

toy that is manifestly designed to emit sound and intended to be used close to the ear, i.e. in a hypothetical position, normally 2,5 cm from the nearest sound-emitting part of such a toy that can be put against the ear of a child

EXAMPLES Telephones that ring or beep in the earpiece and toys with earphones.

F.1.2

hand-held toy

toy that is manifestly designed to emit sound, intended to be held in the hand

EXAMPLES Clicking toys, toy tools, musical toys and cap-firing toys; but excluding close-to-the-ear toys and child-actuated toys as well as mouth-actuated toys.

F.1.3

rattle

toy that is manifestly designed to emit sound when shaken, intended for children who are too young to sit up unaided, and is activated by the child or other person

F.1.4

squeeze toy

pliable toy incorporating a noise-making feature activated by forcing air through an opening, manifestly designed to emit sound when squeezed, intended for children who are too young to sit up unaided

F.1.5

table-top and floor toy

toy that is intended to be used on a table or floor

EXAMPLES Cars, mechanical animals, large and bulky toys.

F.2 Requirements (see EN 71-1:1998)

NOTE See F.5 for rationale.

The requirements in this clause do not apply to:

- mouth-actuated toys, i.e toys whose noise level is determined by the blowing action of the child (e.g. whistles and imitation instruments such as trumpets, flutes);
- child-actuated toys, i.e. toys whose noise level is determined by the muscular action of the child (e.g. xylophones, bells, drums). Rattles and squeeze toys, however, are covered by the requirements;

- tape players, CD players and other similar electronic toys. However, if such toys are provided with headphones or earphones, they are covered by the requirements.

When tested according to F.3 (determination of emission sound pressure levels), toys which are manifestly designed to emit sound shall conform to the following requirements.

- The A-weighted emission sound pressure level, L_{pA} , produced by close-to-the-ear toys shall not exceed 92 dB when measured in a free field.
 - The value of 92 dB remains in force for a period of three years after the date of availability of EN 71-1. After that period the value shall be 80 dB.
 - The A-weighted emission sound pressure level, L_{pA} , produced by close-to-the-ear toys shall not exceed 102 dB when measured using an ear coupler.
 - The value of 102 dB remains in force for a period of three years after the date of availability of EN 71-1. After that period the value shall be 90 dB.
- The A-weighted single-event emission sound pressure level, $L_{pA,1s}$, produced by rattles or squeeze toys shall not exceed 85 dB.
- The C-weighted peak emission sound pressure level, $L_{pC \text{ peak}}$, produced by rattles or squeeze toys shall not exceed 110 dB.
- The C-weighted peak emission sound pressure level, $L_{pC \text{ peak}}$, produced by a toy using percussion caps shall not exceed 140 dB.

NOTE 140 dB at the measurement position corresponds to 150 dB to 160 dB at a distance of approximately 2,5 cm.

 - The value of 140 dB remains in force for a period of three years after the date of availability of EN 71-1. After that period the value shall be 125 dB.
- The C-weighted peak emission sound pressure level, $L_{pC \text{ peak}}$, produced by any type of toy, excluding toys using percussion caps, shall not exceed 125 dB.
- If the C-weighted peak emission sound pressure level, $L_{pC \text{ peak}}$, produced by a toy exceeds 110 dB, the potential danger to hearing shall be drawn to the attention of the user (see F.4).

F.3 Determination of emission sound pressure level (see F.2)

F.3.1 Installation and mounting conditions

F.3.1.1 General

Carry out the measurements on a new toy. Test battery toys using new primary batteries or fully charged secondary batteries.

External power supplies should not be used as they will, in many cases, affect the performance of the toy.

F.3.1.2 Test environment

The test environment can be any environment which meets the requirements of ISO 3746, annex A.

In practice, this means that most normally furnished rooms with a volume exceeding 30 m³ will qualify at measurement distances of 50 cm, providing that the largest dimension of the toy does not exceed 50 cm. For distances shorter than 25 cm, almost any environment will qualify.

If the more accurate ISO 11201 is used, the test environment should meet the requirements of ISO 3744.

F.3.1.3 Mounting

Test rigs used for the mounting of toys, and/or the operator of the toy, shall not affect the sound emission of the toy under test, nor cause sound reflections which will increase the sound pressure levels at the measuring points.

NOTE 1 It is often convenient to be able to rotate the test object instead of moving the microphone.

Mount close-to-the-ear toys and hand-held toys in a proper test rig at least 100 cm above the reflecting plane, or have them operated by an adult operator with the arm outstretched.

NOTE 2 If an operator is used, hearing protectors should be used when testing very loud toys.

Place stationary table-top and floor toys on the reflecting plane (the floor).

NOTE 3 Alternatively, the toys may be placed on a standard test table as described in ISO 11201.

Mount self-propelled table-top and floor toys on the reflecting plane in a test rig so that they can be operated with full power, but are prevented from moving around.

Place pull and push toys on the reflecting plane and fix them in a test rig, enabling them to be moved with varying speed along a direct line which passes the measuring microphones ("passing-by" test). Make sure that the friction of the reflecting plane prevents wheels from skidding.

Place hand-actuated wind-up toys, with the wind-up spring fully loaded, on the reflecting plane so that the front of the toy is 40 cm ± 1 cm along the *x*-axis from the microphones of the "passing-by" test (see Figure F.4).

Mount insert earphones in an artificial ear in accordance with IEC 60126. Mount supra-aural earphones on an artificial ear in accordance with IEC 60318. Mount circum-aural earphones on an artificial ear in accordance with IEC 60318 but supplied with a special adaptor.

Mount other types of toys in the most appropriate way using the principles described in previous paragraphs.

F.3.1.4 Operating conditions

Operate the toy under test in that mode of its intended or foreseeable use which produces the highest emission sound pressure level to the microphone position, where the maximum noise level is observed.

In particular:

- Operate a hand-actuated toy manually, excluding pull and push toys, by applying the force at the point and direction of its intended or foreseeable use, giving the maximum emission sound pressure level. For a toy intended to be shaken, use a movement of ± 15 cm three times per second.
- Operate a rattle by grasping it where it is meant to be held or, if in doubt, where the longest lever between the hand and the sound emitting part of the rattle can be obtained. Make sure that the radiated sound is not affected by the grip of the hand. Strike downwards 10 times with hard lashes in a slow tempo. Use the wrist and keep the forearm essentially horizontal. Endeavour to achieve the highest possible sound level. Stand side-face with the microphone and keep the rattle at the same height as the microphone at a distance of 50 cm.
- Operate a squeeze toy by grasping the toy with both hands and holding it where it is meant to be held or, if in doubt, where the highest sound level can be achieved. Squeeze with both thumbs to achieve the highest

possible sound level. Repeat 10 times at a slow pace. Stand directly in front of the microphone. Keep the air hole at a distance of 50 cm from the microphone and direct it towards the microphone.

- Operate a pull-and-push toy at a maximum speed of 2 m/s, giving the maximum emission sound pressure level.
- Operate a cap-firing toy using percussion caps recommended by the manufacturer and which are available on the market.
- Operate tape players, CD players and similar electronic toys, provided with headphones or earphones, with a standardized recording.

F.3.2 Measurement procedure

F.3.2.1 Basic International Standards to be used

The minimum requirement is to determine emission sound pressure levels at the specified positions around the toy in accordance with ISO 11202 and ISO 11204, which are survey methods. In case of dispute, the more accurate ISO 11201 shall be used.

NOTE 1 Because of fewer reflections from the room boundaries, ISO 11201 will tend to give slightly lower values than ISO 11202 and ISO 11204.

NOTE 2 In certain cases, ISO 11204 can have the accuracy of an engineering method.

F.3.2.2 Instrumentation

The instrumentation system, including the microphone and cable, shall meet the requirements of a type 1 or type 2 instrument as specified in IEC 60651 or, in the case of integrating-averaging sound level meters, in IEC 60804. When measuring high peak emission sound pressure levels, e.g. from toys using percussion caps, the microphone and the entire instrumentation system shall have the capability of handling linear peak levels exceeding the C-weighted peak levels by at least 10 dB.

When ISO 11201 is used, a type 1 instrument is required.

F.3.2.3 Microphone positions

F.3.2.3.1 General

Several microphone positions shall be used. In practice this often means that one microphone is moved from position to position. Whenever it is practicable, it is always an alternative to rotate the test object instead. Attention must be paid to maintaining the correct measuring distance.

F.3.2.3.2 Close-to-the-ear toys

Locate the position of the maximum sound pressure level (L_{pA}) (see F.3.2.4) of a close-to-the-ear toy by moving the toy or the measuring microphone so that the measuring distance is $2,5 \text{ cm} \pm 0,5 \text{ cm}$ from that surface of the toy, where the main sound source exists. This position is the microphone position for measurements. For earphones and headphones, the microphone positions are given by the coupler.

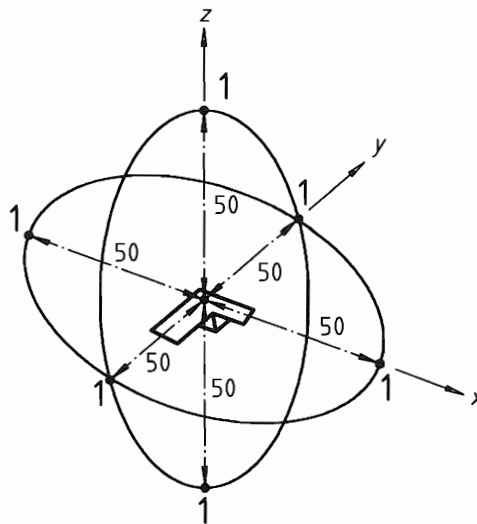
F.3.2.3.3 Child-actuated and hand-held toys

F.3.2.3.3.1 Cap-firing toys

Use six microphone positions around the toy. Place the main sound emitting part of the toy at the origin of the measuring coordinate system in its normal operating orientation in such a way that the main axes of the toy coincide with the axes of the measuring coordinate system (see Figure F.1). If the length of the toy exceeds 50 cm, rotate the toy in the xy -plane 45° around the z -axis without changing the microphone positions.

Select two microphone positions along each axis at a distance of $50 \text{ cm} \pm 1 \text{ cm}$ to both directions from the origin as shown in Figure F.1

Dimensions in centimetres



Key

1 Microphone

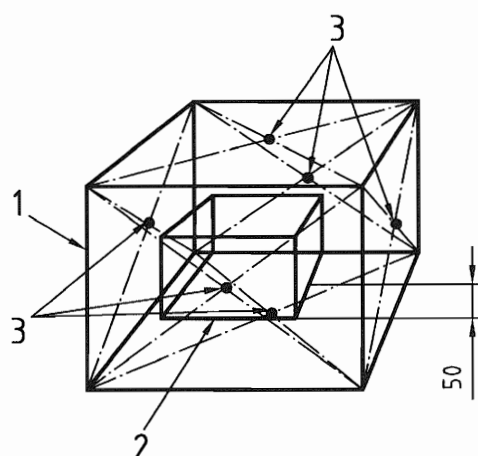
Figure F.1 — Microphone positions for the measurement of the emission sound pressure levels of hand-held and child-actuated toys

F.3.2.3.3.2 Rattles and squeeze toys

Mount the microphone 1,2 m above the floor and at a distance of 0,5 m from the sound source in a room either large enough or sound-absorbing enough to make all sound reflections negligible.

F.3.2.3.3.3 Other hand-held toys

Select six microphone positions on a box-shaped measurement surface at the measuring distance of 50 cm from the reference box of the toy, as defined in ISO 3746, as specified in Figure F.2. The positions are at the centres of the sides of the measurement surface at a distance 50 cm from the reference box.

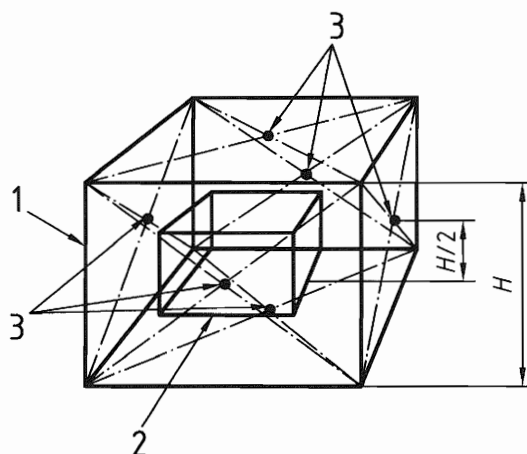
**Key**

- 1 Measurement box
- 2 Reference box
- 3 Microphone

Figure F.2 — Microphone positions for hand-held toys other than cap-firing toys

F.3.2.3.4 Stationary and self-propelled table-top and floor toys

Select five, or if the length or width of the toy is larger than 100 cm, nine microphone positions on a box-shaped measurement surface at the measuring distance of 50 cm from the reference box of the toy as specified in Figure F.3. The sides of the measurement box with height H shall always be 50 cm from the sides of the reference box. All microphone positions are on the measurement box.

**Key**

- 1 Measurement box
- 2 Reference box
- 3 Microphone

Figure F.3 — Microphone positions for the measurement of stationary and self-propelled table-top and floor toys

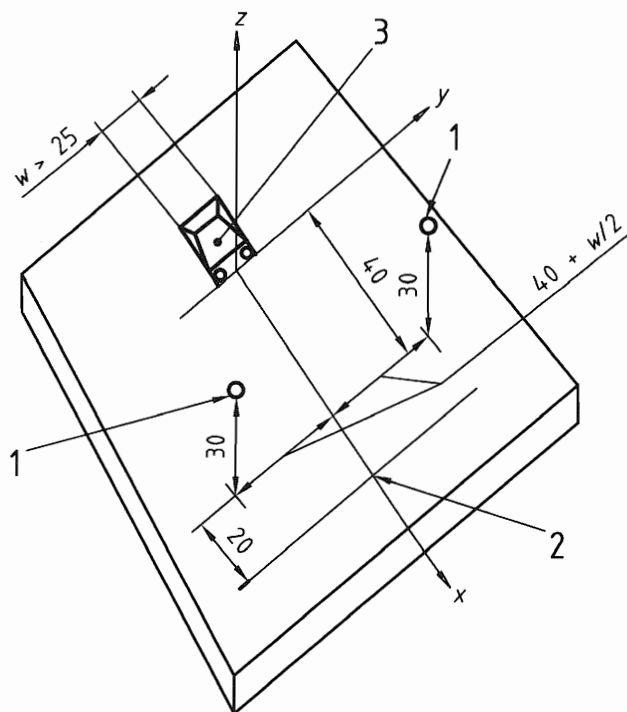
F.3.2.3.5 Pull- and push-toys and hand-activated spring-propelled toys

For toys with a width of 25 cm or less, use two microphones at positions 50 cm from the x -axis of the measuring coordinate system, as shown in Figure F.4.

For toys with a width of more than 25 cm, use two microphones at positions 40 cm plus half the width of the toy from the x -axis as shown in Figure F.4 ($40 + w/2$ in Figure F.4).

Place the toy on a test rig or on the reflecting plane in its normal operating orientation in such a way that movement of the toy is possible along the x -axis passing the microphone positions.

Dimensions in centimetres



Key

- 1 Microphone
- 2 End of measurement
- 3 Toy

Figure F.4 — Microphone positions for the measurements of pull- and push-toys and for hand-actuated spring-propelled toys ("passing-by" test)

F.3.2.4 Measurements

F.3.2.4.1 General

Normal operating mode(s) shall be reached before the tests are performed.

If the toy under test has a clearly defined operating cycle, measure the time average (the equivalent continuous) sound pressure level in each microphone position during at least one whole cycle. Quiet periods longer than 15 s shall be excluded from the measurement period.

For pass-by tests, measure the maximum C-weighted sound pressure level. Measure twice on each side.

If the toy under test produces continuous noise without a clearly defined operating cycle, measure the time-average (the equivalent continuous) sound pressure level in each microphone position during at least 15 s, including the operational mode where the noise level is highest.

Measure the peak level of at least three impulses (events, cycles) in each microphone position.

Repeat the measurement procedure at each microphone position.

F.3.2.4.2 Measurement for rattles and squeeze toys

Measure the A-weighted single-event emission sound pressure level, $L_{pA,1s}$, and the C-weighted peak emission sound pressure level, $L_{pC \text{ peak}}$ for ten movements (squeezes, beats). Repeat three times.

NOTE As an alternative to SEL, L_{Aeq} can be measured and the total measurement time t registered. The single-event emission sound pressure level can then be calculated from $SEL = L_{Aeq} + 10 \lg(t)$.

F.3.2.4.3 Measurement results

Sound measurement results shall be given as:

- a) A-weighted emission sound pressure level at the specified position, L_{pA} , in decibels;
- b) A-weighted single event emission sound pressure level at the specified position, $L_{pA,1s}$, in decibels;
- c) C-weighted peak emission sound pressure level at the specified position, $L_{pC \text{ peak}}$, in decibels.

NOTE Because of the low cost of toys, the primary method used in EN 71-1 has the grade of accuracy of an ISO survey method which requires a lower measurement effort than the corresponding engineering method which is normally used for noise measurements. However, users of EN 71-1 are encouraged to use the more accurate engineering method, especially when the noise level is close to the limit value.

The highest value recorded (L_{pA} and $L_{pC \text{ peak}}$) at any of the microphone positions is the measurement result.

For rattles and squeeze toys, the result is the average of the SEL-levels and the highest of the peak levels. Subtract 10 dB from the $L_{pA, 1s}$ to get the value for one.

F.4 Warnings and instructions for use [see F.2 f)]

Toys which produce high impulsive sound levels or their packaging shall bear the following warning:

"Warning! Do not use close to the ear! Misuse may damage hearing."

For toys using percussion caps, add:

"Do not fire indoors!"

F.5 Rationale (see F.2)

These requirements are intended to reduce the risk of damage to hearing due to high continuous and impulsive noise levels. They apply only to toys that are manifestly designed to emit sound, i.e. toys that have sound-producing features such as electric or electronic devices, motors that emit sounds, percussion caps, rattling components etc.

The definitions in annex F are included to assist the interpretation of clause F.2 (Requirements) and F.3 (Determination of emission sound pressure level).

Many toys emit continuous noise and/or impulsive noise. The sensitivity of children to loud noise is basically unknown. However, there are scientists who hold the opinion that, since the auditory canal in children is smaller than in adults, there is a different amplification which makes children more sensitive to high frequency sounds.

Impulsive noise is especially hazardous, since it is very difficult for the human ear to determine the sound levels due to the very short time factor. It is a fact that permanent damage to hearing may occur after only one exposure to high-peak sound levels.

Acoustic toys shall, of course, also comply with all other relevant requirements of EN 71-1.

Bibliography

- [1] ISO 3744:1994, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane.*
- [2] ISO 3746:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane.*
- [3] ISO 8098:1989, *Cycles — Safety requirements for bicycles for very young children.*
- [4] ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane.*
- [5] ISO 11202:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method in situ.*
- [6] ISO 11204:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Method requiring environmental corrections.*
- [7] IEC 60126:1973, *IEC reference coupler for the measurement of hearing aids using earphones coupled to the ear by means of ear inserts.*
- [8] IEC 60318-1:1998, *Electroacoustics — Simulators of human head and ear — Part 1: Ear simulator for the calibration of supra-aural earphones.*
- [9] IEC 60651:1979, *Sound level meters.*
- [10] IEC 60804:1985, *Integrating-averaging sound level meters.*
- [11] EN 71-1:1998, *Safety of toys — Part 1: Mechanical and physical properties.*
- [12] *Guidelines for Relating Children's Ages to Toy Characteristics* (1985) and *Manufacturers' Abbreviated Guide for Age-Labeling Toys: Matching Toy Characteristics to Children's Ages* (1993), US Consumer Product Safety Commission, Washington, D.C. 20207, USA.
- [13] The Institute of Sound and Vibration Research at the Southampton University, UK, *Noise from toys and its effect on hearing*, August 1997.
- [14] IEC 62115¹⁾, *Particular requirements for the safety of electric toys.*

1) To be published.

APPENDIX ZZ

LIST OF VARIATIONS TO ISO 8124-1:2000 FOR AUSTRALIA AND NEW ZEALAND

(Normative)

This Appendix lists variations between this Standard and ISO 8124-1.

Clause 3.2 *Delete* the word 'shallow'.

Clause 3.34 *Replace* the words: 'areic mass' with 'mass per unit area'.

Clause 4.3.1 *Replace* the words 'unaided eye' with 'normal corrected vision'.

Clause 4.10 *Add* the following Item

- (c) Flexible plastic bags that have a nominal thickness 0.038 mm or greater and without perforations as defined in Item (b) above shall carry a legible cautionary label similar to the following:

WARNING:

TO AVOID SUFFOCATION AND DANGER TO BABIES AND CHILDREN,
DISPOSE OF THIS BAG IMMEDIATELY.

Clause 4.18.2(d) *Delete* existing item (d) and *replace* with the following:

Each projectile, without compressing it and whatever its orientation, shall not fit entirely into the small parts cylinder, as shown in Figure 13. This requirement applies regardless of the age group for which the toy is intended.

Clause 4.19 *Delete* the words 'Aquatic toys shall carry a warning that the product is not a life-saving device (see C.2.6 for guidance),' and *replace* with 'Aquatic toys shall carry warnings in accordance with C.2.6.'

Clause 4.23 *Add* NOTE: 1 K temperature difference = 1°C temperature difference.

Figure 19 *Add* NOTE: Point tester can be obtained from Instrument and Marketing Service Inc.

Clause C.2.6 *Delete* paragraph and *replace* with 'An aquatic toy shall carry the following warning statement using block capitals no less than 6 mm in height in a colour contrasting with background:

WARNING

AQUATIC TOY

USE ONLY UNDER SUPERVISION'

Clause E.33

- 1 *Delete* first paragraph, second sentence.
- 2 *Delete* words 'shallow', 'generally', 'the' and 'of an adult' in the last sentence.

A2

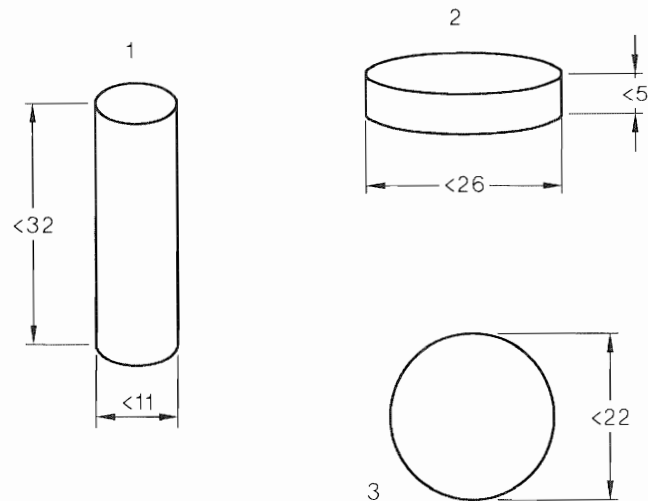
Clause 3.55 (new) Add the following after Clause 3.54:

3.55

hazardous magnet

a magnet which has a flux index greater than $50 \text{ kG}^2\text{mm}^2$ when determined in accordance with 5.25 (determination of magnetic flux index) and which is in any of the following shapes and sizes (refer to Figure 6(A)):

- 1 A cylinder with a length of not more than 32 mm and a diameter of not more than 11 mm.
- 2 A disk with a diameter of not more than 26 mm and a thickness of not more than 5 mm.
- 3 A sphere with a diameter of not more than 22 mm.
- 4 Any solid that will fit entirely within the volume or envelop of any of the above defined shapes.



Key

- 1 Cylinder
- 2 Disk
- 3 Sphere

Dimensions in millimetres

Figure 6(A) – Hazardous magnets shapes and sizes

Clause 3.56 (new) Add the following after Figure 6(A):

3.56

hazardous magnetic component

any part of a toy that meets the dimensional criteria set forth in 3.55 that contains an attached or embedded magnet and which has a flux index of greater than $50 \text{ kG}^2\text{mm}^2$ when determined in accordance with 5.25 (Determination of magnetic flux index).

Clause 4.28 (new) Add the following after Clause 4.27:

4.28 Magnets (see E.40)

The following requirements do not apply to magnets used in motors, relays, speakers, electrical components, and similar devices where the magnetic properties are not part of the play pattern of the toy.

- a) Toys containing a discrete as-received hazardous magnet or a discrete as-received hazardous magnetic component shall carry a warning (see C.2.19 for guidance).
- b) Toys shall not liberate a hazardous magnet or hazardous magnetic component after being tested for normal use (see 4.1 for guidance) and reasonably foreseeable abuse in accordance with 5.24.

Clause 5.25 and Figure 22 (new) Add the following after Figure 21:

5.25 Determination of magnetic flux index (see 3.55 and 4.28)

5.25.1 Flux density measurement

5.25.1.1 Apparatus

D.C. field gauss meter with a resolution of 5 gauss (G) and an axial type probe.

- a) An active area diameter of $0,76 \pm 0,13$ mm.
- b) A distance between the active area and probe tip of $0,38 \pm 0,13$ mm.

5.25.1.2 Procedure

- a) Place the probe's tip in contact with the pole surface of the magnet. For a magnetic component (where the magnet is fully or partially imbedded in part of the toy), place the probe's tip in contact with the surface of the component.
- b) Keep the gauss meter's probe perpendicular to the surface.
- c) Move the probe across the surface to locate the maximum absolute flux density.
- d) Record the maximum absolute flux density measurement.

5.25.2 Area measurement of the pole surface

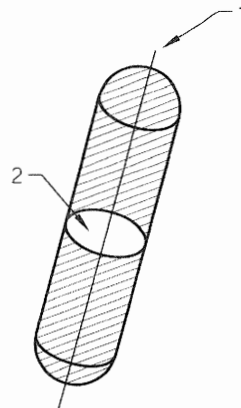
5.25.2.1 Apparatus

A caliper or similar device with a resolution of 0,1 mm.

5.25.2.2 Procedure

If the magnet is imbedded/attached as part of a magnetic component, extract the magnet from the component. If the pole surface of the magnet is flat, calculate the area using the appropriate geometric formula. If the pole is not flat (for example, hemispherical), the pole surface area is the maximum cross-section of the magnet perpendicular to an axis through the magnet poles (see Figure 22).

NOTE: On multi-pole magnets use the area of the largest single pole, which can be determined using magnetic field viewing film or equivalent.

**Key**

- 1 Axis through magnetic poles
- 2 Maximum cross-section perpendicular to axis

Figure 22 – Illustration of pole surface on a magnet with rounded ends

5.25.3 Calculation

The magnetic flux index (kG^2mm^2) is calculated by multiplying the area of the pole surface (mm^2) of the magnet by the square of the maximum flux density (kG^2).

Clause C.2.19 (new) Add the following after Paragraph C2.18:

C.2.19 Magnets (see 4.28)

The packaging and instructions of toys which contain loose as-received hazardous magnets or loose as-received hazardous magnetic components should include a statement similar to the following:

“Warning! The product contains small magnet(s). Swallowed magnets can stick together across intestines causing serious infections and death. Seek immediate medical attention if magnet(s) are swallowed or inhaled.”

Clause E.40 (new) Add the following after Paragraph E.39:

E.40 Magnets (see 4.28)

These requirements apply to all toys. They are intended as an interim measure to partially address ingestion hazards associated with any toys used by all age groups that contain a hazardous magnet or hazardous magnetic component. These requirements do not apply to magnets used in motors, relays, speakers, electrical components, and similar devices where the magnetic properties are not part of the play pattern of the toy.

It is expected that further requirements will be added in the future once testing procedures addressing specific normal use and reasonable foreseeable abuse for toys containing hazardous magnets are developed.

AMENDMENT CONTROL SHEET

AS/NZS ISO 8124.1:2002

Amendment No. 1 (2007)

REVISED TEXT

SUMMARY: This Amendment applies to Appendix ZZ.

Published on 25 May 2007.

Amendment No. 2 (2009)

REVISED TEXT

SUMMARY: This Amendment applies to Appendix ZZ.

Published on 20 February 2009.

Amendment No. 3 (2009)

CORRECTION

SUMMARY: This Amendment applies to Appendix ZZ.

Published on 3 August 2009.

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Ruling

RUL ST.1:2012

Rulings to safety of toys Standards

Ruling 1: Small parts

(Ruling to AS/NZS ISO 8124.1:2010)

Enquiry:**Clauses 4.4.2 and 5.2**

Does the requirement for a warning in Clause 4.4.2 apply to toys where the only small parts are those liberated after testing according to Clause 5.24?

Ruling:

The requirement for a warning applies only if the toy or removable components of the toy are small parts in the as-received condition. Components 'liberated after testing in accordance with Clause 5.24 (reasonably foreseeable abuse tests)' that are small parts are not intended to be covered by Clause 4.4.2.

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